CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 2002-0112
NPDES PERMIT NO. CA0005550

REISSUING WASTE DISCHARGE REQUIREMENTS FOR:
VALERO REFINING COMPANY-CALIFORNIA
BENICIA REFINERY
BENICIA, SOLANO COUNTY

FINDINGS

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter called the Board, finds that:

1. *Discharger and Permit Application.* Valero Refining Company-California, Benicia Refinery (hereinafter called the Discharger) has applied to the Board for reissuance of waste discharge requirements and a permit to discharge treated wastewater and stormwater to waters of the State and the United States under the National Pollutant Discharge Elimination System (NPDES).

Facility Description

2. The Discharger operates a petroleum refinery with an average crude-run throughput of approximately 135,000 barrels per day. The Discharger has proposed to increase crude-run throughput to 165,000 barrels per day. The Discharger manufactures hydrocarbon products, byproducts and intermediates, and is classified as a cracking refinery as defined by the U.S. Environmental Protection Agency (USEPA) in 40 CFR 419.20.

3. The USEPA and the Board have classified this Discharger as a major discharger.

Purpose of Order

4. This NPDES permit regulates the discharge of effluent from the Discharger's wastewater treatment plant (WWTP) and the discharges of all storm water associated with industrial activity from the refinery to Suisun Bay and Carquinez Strait, both waters of the United States. These discharges are currently governed by Waste Discharge Requirements specified in Order No. 96-068, adopted by the Board on May 15, 1996. The conditions of Order No. 96-068 were continued in effect past the expiration date, in accordance with NPDES regulations, by a letter dated December 18, 2000.

Discharge Description

5. The discharges are described below and are based on information contained in the Discharger's Report of Waste Discharge (ROWD) and recent self-monitoring reports. Figures 1 and 2 of this Order show the flow diagram for the process wastewater system. Figures 3 and 4 show the drainage areas and discharge locations for the storm water discharges. Not all of the storm water outfalls (002-017) represent final outfalls to receiving waters but rather some are internal locations within the facility's drainage system where runoff from discrete areas of the plant is contained.

a. **Outfall 001** consists of an average of 2.34 million gallons per day (MGD) of treated process wastewaters including stripped sour water, cooling tower and boiler blowdown, crude water draw from onsite and offsite storage facilities, raw water treatment backwash, ballast water, storm water runoff from process areas, extracted groundwater from on-site remediation activities, and monitoring well purge water from off-site service stations owned by the Discharger. The ROWD indicates that the increase in crude throughput proposed by the Discharger will result in an increase of about 0.22 mgd of process wastewater. Additionally, the Discharger proposes to route wastewater from its asphalt plant to its onsite WWTP (currently the Discharger routes asphalt plant wastewater to the City of Benicia WWTP). The ROWD indicates that this will result in the additional treatment of about 0.04 mgd of wastewater. Figure 1 shows the wastewater sources to Outfall 001.

Oily wastewater streams are first treated in corrugated plate separators (CPS), and induced static flotation (ISF) units to remove oils and solids. Most of the non-oily waste stream from the sour water stripper (stripped sour water) is initially aerobically treated in two prebiox activated sludge units. A smaller portion of the stripped sour water is then combined with the oily wastewater streams and the prebiox effluents and is treated in three parallel activated sludge biological treatment units to which powder activated carbon is added. Treatment continues with three clarifiers in parallel. Effluent from the clarifiers is discharged to an induced air flotation (IAF) unit, which provides additional solids removal. From the IAF unit, wastewater flows to a reactor clarifier where ferric chloride is added to co-precipitate selenite. Polymer is also added to enhance flocculation. Caustic is then added for pH control and wastewater flows to a sump. From the sump, effluent is pumped to Outfall 001. The Discharger has indicated that it will on occasion use its crude field retention pond to store treated wastewater when preliminary data indicates that it might violate effluent limits. After subsequent testing, the Discharger may return effluent from the crude field retention pond to its WWTP for full or partial treatment. If testing shows that all effluent limits are met, the Discharger may return effluent from the crude field retention pond to the final pond sump without additional treatment. Figure 2 shows a wastewater flow diagram for the treatment plant.

Outfall 001 discharges to Suisun Bay (lat. 38°03'18", long. 122°07'07") at a depth of 18 feet about 1,100 feet offshore, west of the Suisun Reserve Fleet Anchorage, through a 12-inch diameter outfall with 3 diffusion ports. To comply with Discharge Prohibition A.1 of the previous Order, the Discharger's diffuser must provide a minimum initial dilution of 10:1. The quality of the discharge based on 1999-2001 monitoring data is presented in the table below. The table reflects detected constituents and values only. No organic constituents were detected in the effluent during 1999-2001.

Parameter	Average	Daily Maximum
pH, standard units	--	8.8
BOD_5, mg/L	1.8	8.2
BOD_5, lbs/d	28.8	126.5
COD, mg/L	66.4	260
COD, lbs/d	1044.2	3556.2
TSS, mg/L	5.9	23
TSS, lbs/d	99.03	402.8
Ammonia as N, mg/L	0.21	1.8
Ammonia as N, lbs/d	3.13	22.22
Oil and Grease, mg/L	1.7	5.8
Total Phenols, µg/L	9.1	22
Total Phenols, lbs/d	0.15	0.44

Parameter	Average	Daily Maximum
Aluminum, µg/L	382.3	1500
Cr (VI), µg/L	15.25	18
Cr (VI), lbs/d	0.22	0.26
Cobalt, µg/L	1.41	1.43
Copper, µg/L	15.2	35.2
Cyanide, µg/L	19.6	50
Lead, µg/L	4.5	8
Mercury, µg/L	0.016	0.053
Nickel, µg/L	18.2	76.1
Selenium, µg/L	23.5	44
Total Chromium, µg/L	15	26
Total Chromium, lbs/d	0.27	0.44
Vanadium, µg/L	23.3	98
Zinc, µg/L	40.2	102

This Order continues to allow the Discharger's reuse of treated effluent for on-site landscape irrigation, and in the refinery firewater system as a water conservation measure. This reuse is approved provided no irrigation water runoff from the facility occurs, and all water in the firewater system is captured and retreated in the Discharger's wastewater treatment plant.

b. **Outfall 002** consists of storm water runoff from an unpaved area of approximately 1.8 acres, located along the western boundary of the Discharger's wastewater treatment plant. The area is occasionally used to store equipment and is separated from the plant by a dike. The discharge is through a ditch and several pipes into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°03'53", long. 122°07'37"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	18.4	36.5
TSS, mg/L	78.5	158
Oil and Grease, mg/L	1.5	7.7

c. **Outfall 003** consists of storm water runoff from a 19 acre unpaved area. The discharge is near the Raw Water Break Tank at the north end of Avenue 'A' via a culvert to Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°04'49", long. 122°08'12"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	14.8	75.4
TSS, mg/L	74.4	599
Oil and Grease, mg/L	0.2	2.7

d. **Outfall 004** consists of storm water runoff from a 0.51-acre gravel area between First Street and the railway, on the south side of First Street. The runoff is discharged west of Gate No. 4 into the eastern end of a ditch (Beaver Creek), followed by a culvert, another ditch (Buffalo Wallow), and a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°03'59", long. 122°07'58"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	5.3	15.6
TSS, mg/L	83.8	308
Oil and Grease, mg/L	0.2	1.1

e. **Outfall 005** consists of storm water runoff from a 69-acre area that is primarily unpaved (1 percent paved surface). This area is located west of the processing area. The area is primarily open space, and consists of roads, parking and administration buildings for contractors, and a laydown area for miscellaneous equipment. The runoff is discharged west of Gate No. 4, on the south side of the processing area via a spillway into the western end of a ditch (Beaver Creek), followed by a culvert, another ditch (Buffalo Wallow), and a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°03'58", long. 122°08'05"). A natural spring also discharges to this drainage. The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	12.8	44.3
TSS, mg/L	69.3	256.5
Oil and Grease, mg/L	0.1	1.4

f. **Outfall 006** consists of condensate from steam traps, groundwater seepage and storm water runoff from a 3.5-acre unpaved area along and under the crude pipeline, starting at the southwest corner of the crude tank field and running northeast along the perimeter of the tank field and Park Road. It includes runoff from the adjacent city road. The runoff collects in a concrete sump equipped with a containment valve and a hydrocarbon detector, which alarms at a central control house and automatically closes the containment valve in the event of a leak. Outfall 006 discharges to a ditch, which flows into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°03'50", long. 122°07'57"). A natural spring also discharges to this drainage. The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	12.2	36.8
TSS, mg/L	165.2	685
Oil and Grease, mg/L	0.1	1.6

g. **Outfall 007** consists of storm water runoff from a 0.69-acre gravel and paved area. This area forms part of the access road to the refinery and is used for temporary parking of vehicles accessing the facility. The runoff discharges just east of Gate 4 via a tributary ditch (Buffalo Wallow) followed by a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°04'02", long. 122°07'54"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	42.4	70.2
TSS, mg/L	469.4	1434
Oil and Grease, mg/L	2.4	3.8

h. **Outfall 008** consists of storm water runoff from a 0.92-acre graveled railway area. This area is located east of the processing area. The runoff is discharged east of Gate No. 4 via a Culvert, into a ditch (Buffalo Wallow), followed by a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°04'02", long. 122°07'53"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	9	17.4
TSS, mg/L	152.7	345
Oil and Grease mg/L	0.0	0.0

i. **Outfall 009** consists of storm water runoff from a 0.25-acre 50% gravel and 50% paved area, located between the railway and Avenue 'A'. The runoff is discharged along Avenue 'A' on the southeast side of the processing area via a culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°04'12", long. 122°07'53"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	23.7	31.6
TSS, mg/L	152	425
Oil and Grease, mg/L	0.9	1.3

j. **Outfall 010** consists of storm water runoff from a 0.84-acre gravel and paved area that is 30% paved. This area is located between the railway and Avenue 'A'. The runoff is discharged along Avenue 'A' on the southeast side of the processing area via a culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°04'12", long. 122°07'53"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	10.5	19
TSS, mg/L	141	407
Oil and Grease, mg/L	0.4	1.2

Since Outfalls 009 and 010 receive storm water runoff from the same area, it is appropriate to combine them for compliance purposes. The combined area of outfalls 009 and 010 is 1.09 acres of which 35% is paved, 12% is gravel, and 53% is unpaved.

k. **Outfall 011** consists of storm water runoff from a 0.38-acre unpaved area under and along the crude pipeline on the north side of Park Road. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff is discharged on the north side of Park Road, where the refinery crude pipeline crosses Park road, via a culvert that discharges into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°03'52", long. 122°07'57"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	8.8	16.7
TSS, mg/L	283	859
Oil and Grease (mg/L)	0.0	0.0

l. **Outfall 012** consists of storm water runoff from a 0.78-acre primarily gravel area (10% paved) under a section of the crude pipeline southwest of the crude tank field. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff discharges into the city of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°03'15", long. 122°08'19"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	13	28.2
TSS, mg/L	21	60
Oil and Grease, mg/L	0.3	1.6

m. **Outfall 013** consists of storm water runoff from a 1.2-acre (5 % paved) area under the crude pipeline southwest of Outfall 012. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff discharges into the City of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°03'08", long. 122°08'25"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	14.8	30.5
TSS, mg/L	153	598
Oil and Grease, mg/L	0.5	1.9

n. **Outfall 014** consists of storm water runoff from a 0.35-acre unpaved area under the crude pipeline south of Outfall 013. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff discharges into the city of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°03'03", long. 122°08'23"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	12.9	24.7
TSS, mg/L	205	601
Oil and Grease, mg/L	0.4	1.6

o. **Outfall 015** consists of storm water runoff from a 0.50-acre unpaved area under the crude pipeline southeast of Outfall 014. Runoff collects in a concrete sump equipped with an automatic valve, and hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff is discharges into the city of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°02'50", long. 122°07'55"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	11.2	30.5
TSS, mg/L	19	79
Oil and Grease mg/L	0.0	0.0

p. **Outfall 016** consists of storm water runoff from a 0.07-acre unpaved area under the crude pipeline south of Outfall 015, near the refinery dock. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff discharges via a culvert into the Carquinez Strait (lat. 38°02'44", long. 122°07'45"). The quality of this discharge based on data presented in the ROWD is as follows:

Parameter	Average	Maximum
TOC, mg/L	14.8	36.7
TSS, mg/L	28	66
Oil and Grease, mg/L	0.3	2.1

q. **Outfall 017** consists of nonprocess storm water runoff from about 12 acres at the asphalt plant of which roughly 35 percent is impervious. Runoff collects in a 0.425 million gallon holding tank (tank No. 33), located north of Buffalo Wallow. From the holding tank, storm water is discharged on a batch basis via an underground culvert to Buffalo Wallow, then to a 72-inch culvert into Sulfur Springs Creek, and ultimately to Suisun Bay (lat. 38°03'58", long. 122°08'05"). Based on self-monitoring data from 2001 and 2002 the quality of this discharge is as follows:

Parameter	Average	Maximum
TDS (mg/L)	150	210
Oil and Grease (mg/L)	3.9	9.2

Regional Monitoring Program

6. On April 15, 1992, the Board adopted Resolution No. 92-043 directing the Executive Officer to implement the Regional Monitoring Program (RMP) for the San Francisco Bay. Subsequent to a public hearing and various meetings, Board staff requested major permit holders in this region, under authority of Section 13267 of California Water Code, to report on the water quality of the estuary. These permit holders, including the Discharger, responded to this request by participating in a collaborative effort, through the San Francisco Estuary Institute. This effort has come to be known as the San Francisco Bay Regional Monitoring Program for Trace Substances. The Discharger has agreed to continue to participate in the RMP, which involves collection of data on pollutants and toxicity in water, sediment and biota of the estuary.

Applicable Plans, Policies and Regulations

Basin Plan

7. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21,1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board (SWRCB) and the Office of Administrative Law on July 20, 1995 and November 13, 1995, respectively. A summary of the regulatory changes is contained in Title 23 of the California Code of Regulations, Section 3912. The Basin Plan identifies beneficial uses and water quality objectives (WQOs) for waters of the state in the Region, including surface waters and groundwaters. The Basin Plan also identifies discharge prohibitions intended to protect beneficial uses. This Order implements the Board's Basin Plan.

Beneficial Uses

8. Beneficial uses for the Carquinez Strait and Suisun Bay receiving waters, as identified in the Basin Plan and based on known uses of the receiving waters in the vicinity of the discharge, are:

a. Industrial Service Supply
b. Navigation
c. Water Contact Recreation
d. Non-contact Water Recreation
e. Commercial and Sport Fishing

f. Wildlife Habitat
g. Preservation of Rare and Endangered Species
h. Fish Migration
i. Fish Spawning
j. Estuarine Habitat

State Implementation Policy (SIP)

9. The SWRCB adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (also known as the State Implementation Policy or SIP) on March 2, 2000 and the Office of Administrative Law (OAL) approved the SIP on April 28, 2000. The SIP applies to discharges of toxic pollutants in the inland surface waters, enclosed bays and estuaries of California subject to regulation under the State's Porter-Cologne Water Quality Control Act (Division 7 of the Water Code) and the federal Clean Water Act. The SIP establishes implementation provisions for priority pollutant criteria promulgated by the USEPA through the National Toxics Rule (NTR) and California Toxics Rule (CTR), and for priority pollutant objectives established by the Regional Water Quality Control Boards (RWQCBs) in their water quality control plans (basin plans). The SIP also establishes monitoring requirements for 2,3,7,8-TCDD equivalents, chronic toxicity control provisions, and Pollutant Minimization Programs. The SIP applies to discharge 001. Discharges 002 through 017 are exempt from the SIP as they are discharges of storm water only.

California Toxics Rule (CTR)

10. On May 18, 2000, the USEPA published the *Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California* (Federal Register, Volume 65, Number 97, 18 May 2000). These standards are generally referred to as the CTR. The CTR specified water quality criteria (WQC) for numerous pollutants, of which some are applicable to the Discharger's effluent discharges.

Other Regulatory Bases

11. WQOs/WQC and effluent limitations in this permit are based on the SIP; the plans, policies and WQOs and criteria of the Basin Plan; California Toxics Rule (Federal Register Volume 65, 97); *Quality Criteria for Water* (USEPA 440/5-86-001, 1986 and subsequent amendments, "USEPA Gold Book"); applicable Federal Regulations (40 CFR Parts 122 and 131); the National Toxics Rule (57 FR 60848, 22 December 1992 and 40 CFR Part 131.36(b), "NTR"); NTR Amendment (Federal Register Volume 60, Number 86, 4 May 1995, pages 22229-22237); USEPA December 10, 1998 "National Recommended Water Quality Criteria" compilation (Federal Register Vol. 63, No. 237, pp. 68354-68364); and Best Professional Judgment (BPJ) as defined in the Basin Plan. Where numeric effluent limitations have not been established or updated in the Basin Plan, 40 CFR 122.44(d) specifies that water quality based effluent limitations (WQBELs) may be set based on USEPA criteria and supplemented where necessary by other relevant information to attain and maintain narrative WQC to fully protect designated beneficial uses. Discussion of the specific bases and rationale for effluent limits are given in the associated Fact Sheet for this Permit, which is incorporated as part of this Order.

12. In addition to the documents listed above, other USEPA guidance documents upon which BPJ was developed may include in part:
    - Region 9 Guidance For NPDES Permit Issuance, February 1994;
    - USEPA Technical Support Document for Water Quality Based Toxics Control (March 1991) (TSD);
    - Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria, October 1, 1993;

- Whole Effluent Toxicity (WET) Control Policy, July 1994;
- National Policy Regarding Whole Effluent Toxicity Enforcement, August 14, 1995;
- Clarifications Regarding Flexibility in 40 CFR Part 136 Whole Effluent Toxicity (WET) Test Methods, April 10, 1996;
- Regions 9 & 10 Guidance for Implementing Whole Effluent Toxicity Programs Final, May 31, 1996;
- Draft Whole Effluent Toxicity (WET) Implementation Strategy, February 19, 1997.

Basis for Effluent Limitations

General Basis

13. *Federal Water Pollution Control Act.* Effluent limitations and toxic effluent standards are established pursuant to sections 301 through 305, and 307 of the Federal Water Pollution Control Act and amendments thereto are applicable to the discharges herein.

Applicable Water Quality Objectives/Criteria

14. The WQO and WQC applicable to the receiving waters for this discharge are from the Basin Plan, the CTR, and the NTR.

    a. The Basin Plan specifies numeric WQOs for 10 priority toxic pollutants, as well as narrative WQOs for toxicity and bioaccumulation in order to protect beneficial uses. The pollutants for which the Basin Plan specifies numeric objectives are arsenic, cadmium, chromium (IV), copper in freshwater, lead, mercury, nickel, silver, zinc, and cyanide (see also c. below). The narrative toxicity objective states in part "[a]ll waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms." The bioaccumulation objective states in part, "[c]ontrollable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered." Effluent limitations and provisions contained in this Order are designed to implement these objectives, based on current available information.

    b. The CTR specifies numeric aquatic life criteria for 23 priority toxic pollutants and numeric human health criteria for 57 priority toxic pollutants. These criteria apply to inland surface waters and enclosed bays and estuaries such as here, except that where the Basin Plan's Tables 3-3 and 3-4 specify numeric objectives for certain of these priority toxic pollutants, the Basin Plan's numeric objectives apply over the CTR (except in the South Bay south of the Dumbarton Bridge).

    c. The NTR established numeric aquatic life criteria for selenium, numeric aquatic life and human health criteria for cyanide, and numeric human health criteria for 34 toxic organic pollutants for waters of San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta. This includes the receiving waters for this Discharger.

Basin Plan Receiving Water Salinity Policy

15. The Basin Plan states that the salinity characteristics (i.e., freshwater vs. saltwater) of the receiving water shall be considered in determining the applicable WQOs . Freshwater objectives apply to discharges to waters both outside the zone of tidal influence and with salinities lower than 5 parts per thousand (ppt) at least 75 percent of the time. Saltwater objectives shall apply to discharges to waters with salinities greater than 5 ppt at least 75 percent of the time. For discharges to waters with salinities in between the two categories or tidally influenced freshwaters that support estuarine beneficial uses, the objectives shall be the lower of the salt or freshwater objectives, based on

ambient hardness, for each substance. For constituents with water quality objectives specified in the Basin Plan, it is appropriate to use the Basin Plan definition for determining if the receiving water is fresh, marine, or estuarine.

CTR Receiving Water Salinity Policy

16. The CTR states that the salinity characteristics (i.e., freshwater vs. saltwater) of the receiving water shall be considered in determining the applicable WQC. Freshwater criteria shall apply to discharges to waters with salinities equal to or less than one ppt at least 95 percent of the time. Saltwater criteria shall apply to discharges to waters with salinities equal to or greater than 10 ppt at least 95 percent of the time in a normal water year. For discharges to water with salinities in between these two categories, or tidally influenced freshwaters that support estuarine beneficial uses, the criteria shall be the lower of the salt or freshwater criteria, (the latter calculated based on ambient hardness), for each substance. In applying CTR, criteria it is appropriate to use the CTR definition for determining if the receiving water if fresh, marine, or estuarine.

Receiving Water Salinity and Hardness

17. a. Salinity. The receiving waters for the subject discharge are the waters of Carquinez Strait and Suisun Bay, which are tidally influenced waterbodies, with significant fresh water inflows during the wet weather season. Furthermore, Carquinez Strait and Suisun Bay are specifically defined as estuarine under both the Basin Plan and CTR definitions. Therefore, the effluent limitations specified in this Order for discharges to Carquinez Strait and Suisun Bay are based on the lower of the marine and freshwater Basin Plan WQOs and CTR and NTR WQC.

b. Hardness. Some WQOs and WQC are hardness dependent. Hardness data collected through the RMP are available for water bodies in the San Francisco Bay Region. In determining the WQOs and WQC for this Order, the Board used a hardness of 46 mg/L, which is the minimum hardness at the Pacheco River Station observed from 1993-2000. This represents the best available information for hardness of the receiving water after it has mixed with the discharge.

Technology-Based Effluent Limits

18. The refinery is classified as a "cracking refinery" as defined by the USEPA in 40 CFR § 419.20. Therefore, the USEPA Effluent Guidelines and Standards for Petroleum Refining Point Sources (40 CFR § 419 Subpart B) based on Best Available Technology Economically Achievable (BAT), Best Practicable Control Technology (BPT), and/or Best Conventional Pollutant Control technology (BCT), whichever are more stringent, are applicable to the discharge. The application of these guidelines and standards is based on production rates at the refinery. In calculating effluent limitations, Board staff has used the maximum facility production rate for the past five years (Year 2000). Production rates during this period have generally been very consistent not varying by more than 20 percent. A detailed description of the methodology and data used to calculate the technology-based effluent limitations is included in Attachment A to the Fact Sheet.

Refinery Expansion

19. The Discharger has proposed to increase production rate capacity of the refinery to a crude throughput of up to 165,000 barrels per day. This represents a 22.2 percent increase in production capacity, which corresponds to about an 11 percent increase in wastewater flows. This increase does not meet the definition as a new source as defined in the Code of Federal Regulations (40 CFR 122.29). Specifically, a new source must (a) be constructed at a site where no other source is located, (b) completely replace process or production equipment that cause the discharge of pollutants from an existing source; or (c) have processes that are substantially independent of the site's existing source. As the Discharger intends to modify existing units, it does not appear to meet any of the above criteria. This Order specifies production based effluent limits for current

throughput rates and for the planned increase. The Discharger has indicated that crude throughput increases may not reach 165,000 barrels per day on a sustained basis. Therefore, the Discharger requested that this Order include production based effluent limitations based on an increase to 150,000 barrels per day. This Order requires compliance with the limits based on current throughput until the Discharger demonstrations to the satisfaction of the Executive Officer that the higher limits are justified and warranted based on increased throughput of at least 150,000 barrels per day.

20. The Discharger has also proposed to reroute asphalt plant wastewater to its WWTP. Currently, the Discharger routes this wastewater stream to the City of Benicia's WWTP. The schedule for this change is currently uncertain. Therefore, this Order specifies four separate tiers of production based limits: 1) for current flows, 2) for flows with an increase in crude throughput, 3) for current flows with asphalt plant wastewater, and 4) for flows with increased crude throughput and asphalt plant wastewater. As only asphalt production data from April 2001 through April 2002 was available, Board staff used it to calculate alternative production based effluent limitations. The higher limits do not become effective until the Executive Officer indicates in writing that the Discharger has provided adequate documentation that it has routed asphalt plant wastewater to its wastewater treatment plant.

21. The Discharger proposes to increase the quantity of wastewater discharged to its WWTP by up to 0.26 mgd by late 2004. To treat the additional wastewater, the Discharger indicates that it is considering installing additional treatment units, as its existing WWTP may not have sufficient capacity. To ensure that the increase in flow is consistent with Resolution No. 68-16 (*Statement of Policy with Respect to Maintaining High Quality of Waters in California*), this Order requires the Discharger to submit an Antidegradation Report. The Antidegradation Report shall at a minimum, evaluate treatment capacity, propose additional units as necessary to enable adequate treatment, and address mass increases of pollutants discharged.

Water Quality-Based Effluent Limitations

22. Toxic substances in outfall 001 are regulated by WQBELs derived from water quality objectives listed in the Basin Plan Tables 3-3 and 3-4, the NTR, USEPA recommended criteria, the CTR, the SIP, and/or BPJ. WQBELs in this Order are revised and updated from the limits in the previous permit order and their presence in this Order is based on evaluation of the Discharger's data as described below under Reasonable Potential Analysis (RPA). Numeric WQBELs are required for all constituents that have reasonable potential to cause or contribute to an excursion above any State WQO/WQC. Reasonable potential is determined and final WQBELs are developed using the methodology outlined in the SIP. If the Discharger demonstrates that the final limits will be infeasible to meet and provides justification for a compliance schedule, then interim limits are established, with a compliance schedule to achieve the final limits. Further details about the effluent limitations are given in the associated Fact Sheet.

Receiving Water Ambient Background Data used in Calculating WQBELs

23. The receiving waters for the discharges are estuarine and subject to complex tidal and riverine currents. Therefore, the most representative location of ambient background data for this facility is the Central Bay. WQBELs were calculated using RMP data from 1993 through 2000 for the Yerba Buena and Richardson Bay RMP stations. However, not all the constituents listed in the CTR were analyzed by the RMP during this time. By letter dated August 6, 2001, the Board's Executive Officer addressed this data gap by requiring the Discharger to conduct additional monitoring pursuant to section 13267 of the California Water Code.

Constituents Identified in the 303(d) List

24. On May 12, 1999, the USEPA approved a revised list of impaired waterbodies prepared by the State. The list (hereinafter referred to as the 303(d) list) was prepared in accordance with Section 303(d) of

the federal Clean Water Act to identify specific water bodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations on point sources. Carquinez Strait and Suisun Bay are listed as impaired waterbodies. The pollutants impairing Carquinez Strait and Suisun Bay include copper, mercury, nickel, selenium, PCBs total, dioxins and furans, chlordane, DDT, dieldrin, diazinon, and dioxin-like PCBs. Carquinez Strait and Suisun Bay are also impaired by exotic species.

Dilution and Assimilative Capacity

25. In response to the State Board's Order No. 2001-06, Board staff has evaluated the assimilative capacity of the receiving water for 303(d) listed pollutants for which the Discharger has reasonable potential in its discharge. The evaluation included a review of RMP data (local and Central Bay stations), effluent data, and WQOs/WQC. From this evaluation, it is determined that the assimilative capacity is highly variable due to the complex hydrology of the receiving water. Therefore, there is uncertainty associated with the representative nature of the appropriate ambient background data to conclusively quantify the assimilative capacity of the receiving water. Pursuant to Section 1.4.2.1 of the SIP, "dilution credit may be limited or denied on a pollutant-by-pollutant basis..."

    a. For certain bioaccumulative pollutants, based on BPJ, dilution credit is not included in calculating the final WQBELs. This determination is based on available data on concentrations of these pollutants in aquatic organisms, sediment, and the water column. The Board placed selenium, mercury, and PCBs on the CWA Section 303(d) list. The USEPA added dioxins and furans compounds, chlordane, dieldrin, and 4,4'-DDT on the CWA Section 303(d) list. Dilution credit is not included for the following pollutants: mercury, selenium, polynuclear aromatic hydrocarbons (PAHs), PCBs, dieldrin, 4,4-DDE, and dioxins and furans. The following factors suggest that there is no more assimilative capacity in the Bay for these pollutants.

        i. San Francisco Bay fish tissue data shows that these pollutants, except for selenium and PAHs, exceed screening levels. The fish tissue data are contained in "Contaminant Concentrations in Fish from San Francisco Bay 1997" May 1997. Denial of dilution credits for these pollutants is further justified by fish advisories to the San Francisco Bay. The Office of Environmental Health and Hazard Assessment (OEHHA) performed a preliminary review of the data from the 1994 San Francisco Bay pilot study, "Contaminated Levels in Fish Tissue from San Francisco Bay." The results of the study showed elevated levels of chemical contaminants in the fish tissues. Based on these results, OEHHA issued an interim consumption advisory covering certain fish species from the bay in December 1994. This interim consumption advice was issued and is still in effect due to health concerns based on exposure to sport fish from the bay contaminated with mercury, PCBs, dioxins, and pesticides (e.g., DDT).

        ii. For selenium, the denial of dilution credits is based on Bay waterfowl tissue data presented in the California Department of Fish and Game's Selenium Verification Study (1986-1990). These data show elevated levels of selenium in the livers of waterfowl that feed on bottom dwelling organisms such as clams. Additionally, in 1987 the Office of Environmental Health Hazard Assessment issued an advisory for the consumption of two species of diving ducks in the north bay found to have high tissue levels of selenium. This advisory is still in effect.

        iii. For PAHs, the denial of dilution credits is based on recent evidence that suggests high molecular PAHs are bioaccumulative with impairing status under further review. The Board staff report entitled *Proposed Revisions to Section 303(d) List and Priorities for Development of Total Maximum Daily Loads*, dated December 19, 2001, states:

> "PAHs are known carcinogens that accumulate in shellfish tissue, but do not accumulate in fish tissue. The weight of evidence from the Regional Monitoring Program (RMP) indicates that although water quality criteria are almost never exceeded at RMP stations (between 0 and 1% of RMP water samples individual PAHs exceeded the EPA and CRT criterion) there is evidence that PAHS may be accumulating at higher levels over time (Hoenicke, Hardin, et al., in prep.; Thompson et al., 1999)."

The Board staff Report *Proposed Revisions to Section 303(d) List and Priorities for Development of Total Maximum Daily Loads* also states:

> "PAH water quality objectives from the California Toxics Rule (CTR) are human health-based and are therefore incomplete with respect to potential impacts to aquatic life described above. PAHs are elevated in sediments of about half the toxic hotspot sites identified in the Bay Protection Program exhibiting a correlative (not causative) but potentially synergistic effect on aquatic life along with other chemicals, as evidenced by sediment toxicity tests and degraded benthic communities (BPTCP, 1998). Occasional exceedances of the human health criteria in ambient samples, evidence of increasing shellfish concentrations, and preponderance of PAHs at toxic sites warrant increased assessment activities for PAHs by dischargers and cities around the region."

b. Furthermore, Section 2.1.1 of the SIP states that for bioaccumulative compounds on the 303(d) list, the Board should consider whether mass-loading limits should be limited to current levels. The Board finds that mass loading limits are warranted for certain bioaccumulative compounds on the 303(d) list for the receiving waters of this Discharger. This is to ensure that this Discharger does not contribute further to impairment of the narrative objective for bioaccumulation.

c. For non-bioaccumulative constituents, a conservative allowance of 10:1 dilution for discharges to the Bay is necessary for protection of beneficial uses. The basis for limiting the dilution credit is based on SIP provisions in Section 1.4.2. The following outlines the basis for derivation of the dilution credit.

i. A far-field background station is appropriate because the receiving waterbody (Bay) is a very complex estuarine system with highly variable and seasonal upstream freshwater inflows and diurnal tidal saltwater inputs.

ii. Due to the complex hydrology of the San Francisco Bay, a mixing zone cannot be accurately established.

iii. Previous dilution studies do not fully account for the cumulative effects of other wastewater discharges to the system.

iv. The SIP allows limiting a mixing zone and dilution credit for persistent pollutants (e.g., copper, silver, nickel and lead).

The main justification for using a 10:1 dilution credit is uncertainty in accurately determining ambient background and uncertainty in accurately determining the mixing zone in a complex estuarine system with multiple wastewater discharges. The detailed rationale is described in the Fact Sheet.

Total Maximum Daily Loads (TMDLs) and Waste Load Allocations (WLAs)

26. Based on the 303(d) list of pollutants impairing Carquinez Strait and Suisun Bay, the Board plans to adopt TMDLs for these pollutants no later than 2010, with the exception of dioxin and furan compounds. The Board defers development of the TMDL for dioxin and furan compounds to the USEPA. Future review of the 303(d) list for Carquinez Strait and Suisun Bay may result in revision of the schedules and/or provide schedules for other pollutants.

27. The TMDLs will establish WLAs and load allocations for point sources and non-point sources, respectively, and will result in achieving the water quality standards for the waterbody. The final effluent limitations for this Discharger will be based on WLAs that are derived from the TMDLs.

28. *Compliance Schedules.* Pursuant to Section 2.1.1 of the SIP, "the compliance schedule provisions for the development and adoption of a TMDL only apply when: (a) the Discharger requests and demonstrates that it is infeasible for the Discharger to achieve immediate compliance with a CTR criterion; and (b) the Discharger has made appropriate commitments to support and expedite the development of the TMDL. In determining appropriate commitments, the RWQCB should consider the Discharger's contribution to current loadings and the Discharger's ability to participate in TMDL development." As further described in a later finding under the heading **Interim Limits and Compliance Schedules**, the Discharger by letter dated July 29, 2002 demonstrated that it is infeasible to achieve compliance for certain pollutants. The Board adopted Resolution No. 01-103, on September 19, 2001, which authorizes the Executive Officer of the Board to enter into a Memorandum of Understanding with BACWA, and other parties to accelerate the development of Water Quality Attainment Strategies including TMDLs for the San Francisco Bay-Delta and its tributaries. While the Discharger has agreed to assist the Board in TMDL development, it has not yet made appropriate commitments. To be consistent with the SIP, this Order requires the Discharger to provide documentation that it is participating in TMDL development.

29. The following summarizes the Board's strategy to collect water quality data and to develop TMDLs:
    a. Data collection – The Board has given the dischargers the option to collectively assist in developing and implementing analytical techniques capable of detecting 303(d)-listed pollutants to at least their respective levels of concern or WQOs/WQC. The Board will require dischargers to characterize the pollutant loads from their facilities into the water-quality limited waterbodies. The results will be used in the development of TMDLs, but may also be used to update/revise the 303(d) list and/or change the WQOs/WQC for the impaired waterbodies including Carquinez Strait and Suisun Bay.

    b. Funding mechanism – The Board has received, and anticipates continued receipt of, resources from federal and state agencies for the development of TMDLs. To ensure timely development of TMDLs, the Board intends to supplement these resources by allocating development costs among dischargers through Water Quality Attainment Strategies (referenced in a previous finding) or other appropriate funding mechanisms.

Interim Limits and Compliance Schedules

30. Until final WQBELs or WLAs are adopted, state and federal antibacksliding and antidegradation policies, and the SIP, require that the Regional Board include interim effluent limitations. The interim effluent limitations will be the lower of the following:
    - current performance; or
    - previous order's limits

    This permit establishes interim performance–based limits in addition to interim concentration limits to limit the discharge of certain 303(d)-listed bioaccumulative pollutants' mass loads to their current

levels. These interim performance-based mass limits are based on recent discharge data. Where pollutants have existing high detection limits, interim mass limits are not established because meaningful performance-based mass limits cannot be calculated for pollutants with non-detectable concentrations. However, the Discharger has the option to investigate alternative analytical procedures that result in lower detection limits, either through participation in new RMP special studies or through equivalent studies conducted jointly with other dischargers.

31. Compliance schedules are established based on Section 2.2 of the SIP for limits derived from CTR WQC or based on the Basin Plan for limits derived from the Basin Plan WQOs. If an existing Discharger cannot immediately comply with a new and more stringent effluent limitation, the SIP and the Basin Plan authorize a compliance schedule in the permit. To qualify for a compliance schedule, both the SIP and the Basin Plan require that the Discharger demonstrate that it is infeasible to achieve immediate compliance with the new limit. The SIP and Basin Plan require that the following information be submitted to the Board to support a finding of infeasibility:
    i. documentation that diligent efforts have been made to quantify pollutant levels in the discharge and sources of the pollutant in the waste stream, including the results of those efforts;
    ii. documentation of source control and/or pollution minimization efforts currently under way or completed;
    iii. a proposed schedule for additional or future source control measures, pollutant minimization or waste treatment; and
    iv. a demonstration that the proposed schedule is as short as practicable.

32. The Discharger submitted infeasibility to comply reports on July 29, 2002 for selenium, mercury, nickel, copper, lead, dioxins and furans, 4,4-DDE, and dieldrin. Board staff confirmed that it is infeasible for the Discharger to comply with final WQBELs for selenium, mercury, nickel, copper, lead, and dioxins and furans; but not for 4,4-DDE, and dieldrin. The Discharger indicates it cannot comply with final WQBELs for 4,4-DDE and dieldrin as (a) analytical methods cannot detect and quantify 4,4-DDE and dieldrin at proposed effluent limits and (b) the refinery is not a known source of these contaminants, and therefore, it does not have a practical means to reduce the source(s) of these contaminants. This Order's compliance level for 4,4-DDE and dieldrin is at SIP minimum levels (ML) related to quantification and detection levels. Since the Discharger has never detected either constituent in its effluent, and no known sources of these constituents exist, it is appropriate for the Discharger to immediately comply with final WQBELs at the specified MLs. The demonstration of infeasibility for selenium, mercury, nickel, lead, copper, and dioxins and furans complies with the infeasibility requirements in Section 2.1 of the SIP. This Order establishes compliance schedules for these pollutants that extend beyond 1 year. Pursuant to the SIP, and 40 CFR 122.47, the Board shall establish interim numeric limitations and interim requirements to control the pollutants. This Order establishes interim limits for these pollutants based on the previous permit limits or existing plant performance, whichever is more stringent. Specific basis for these interim limits are described in the following findings for each pollutant.

Antidegradation and Antibacksliding

33. The interim limits in this permit are in compliance with antidegradation because the interim limits hold the Discharger to current facility performance and because the final limits are in compliance with antibacksliding requirements.

Specific Basis

Reasonable Potential Analysis

34. As specified in 40 CFR 122.44(d) (1) (i), permits are required to include WQBELs for all pollutants "which the Director determines are or may be discharged at a level which will cause, have the

reasonable potential to cause, or contribute to an excursion above any State water quality standard." Using the method prescribed in Section 1.3 of the SIP, Board staff has analyzed the effluent data to determine if the discharge from outfall 001 has a reasonable potential to cause or contribute to an excursion above a State water quality standard ("Reasonable Potential Analysis" or "RPA"). For all parameters that have reasonable potential, numeric WQBELs are required. The RPA compares the effluent data with numeric and narrative WQOs in the Basin Plan and numeric WQC from the USEPA Gold Book, the NTR, and the CTR.

35. *RPA Methodology*. The method for determining RPA involves identifying the observed maximum pollutant concentration in the effluent (MEC) for each constituent, based on effluent concentration data. The RPA for all constituents is based on zero dilution, according to section 1.3 of the SIP. There are three triggers in determining reasonable potential.
    a. The first trigger is activated when the MEC is greater than or equal to the lowest applicable WQO/WQC, which has been adjusted for pH, hardness (assumed in this permit analysis at 46 mg/L), and translator data, if appropriate. An MEC that is greater than or equal to the (adjusted) WQO/WQC means that there is reasonable potential for that constituent to cause or contribute to an excursion above the WQO/WQC and a WQBEL is required. (Is the MEC≥WQO/WQC?)
    b. The second trigger is activated if the observed maximum ambient background concentration (B) is greater than the adjusted WQO/WQC and the MEC is less than the adjusted WQO/WQC or the pollutant was not detected in any of the effluent samples and all of the detection levels are greater than or equal to the adjusted WQO/WQC. If B is greater than the adjusted WQO/WQC, then a WQBEL is required. (Is B>WQO/WQC?)
    c. The third trigger is activated after a review of other information determines that a WQBEL is required even though both MEC and B are less than the WQO/WQC. A limit is only required under certain circumstances to protect beneficial uses.

36. *Summary of RPA Data and Results.* The RPA was based on effluent monitoring data of the past three years. Based on the RPA methodology described above and in the SIP, the following constituents have been found to have reasonable potential to cause or contribute to an excursion above WQOs/WQC: chromium (VI), copper, lead, mercury, nickel, selenium, zinc, cyanide, 4, 4'-DDE, Dieldrin, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, PCBs, and dioxin TEQ. Based on the RPA, numeric WQBELs are required to be included in the permit for these constituents.

37. *RPA Determinations*. The maximum effluent concentrations (MEC), WQOs, bases for the WQOs, background concentrations used and reasonable potential conclusions from the RPA are listed in the following table for all constituents analyzed. The RPA results for most of the constituents in the CTR (Nos. 1, 3, 5a, 12, 15, 17-126 except 60-62, 64, 73, 74, 92, 109 and 111) were not able to be determined because of the lack of background data, an objective, or effluent data. (Further details on the RPA can be found in the Fact Sheet.)

Constituent[1]	WQO/ WQC (µg/L)	Basis[2]	MEC outfall 001 (µg/L)	Maximum Ambient Background Conc. (µg/L)	Reasonable Potential
Arsenic	36	BP, sw	<2.5	2.46	No
Cadmium	0.62	BP, fw, H=46	0.56	0.1268	No
Chromium(VI)	11	BP, fw, H=46	18	4.4	Yes
Copper*	3.7	CTR, sw,	35.2	2.45	Yes

Constituent[1]	WQO/ WQC (µg/L)	Basis[2]	MEC outfall 001 (µg/L)	Maximum Ambient Background Conc. (µg/L)	Reasonable Potential
		T=0.83[3]			
Lead	1.2	BP, fw, H=46	8	0.8	Yes
Mercury*	0.025	BP, fw	0.053	0.0064	Yes
Nickel*	7.1	BP, sw	76.1	3.7	Yes
Selenium*	5.0	NTR	44	0.39	Yes
Silver	1.07	BP, fw, H=46	<1	0.0683	No
Zinc	54.89	BP, fw, H=46	102	4.6	Yes
Cyanide	1	NTR(#14)	50	Not available (NA)	Yes
Dieldrin*	0.00014	CTR (#111)	<0.02	0.000264	Yes[4]
4,4-DDE*	0.00059	CTR (#109)	<0.04	0.00069	Yes[4]
Dioxin TEQ*	$1.4x10^{-8}$	BP, CTR (#16)	<0.00000384	Not available (NA)	Yes[5]
Benzene	71	CTR (#19)	<1	Not available (NA)	No
Toluene	200,000	CTR (#39)	<1	Not available (NA)	No
Fluoranthene	370	CTR (#86)	<0.025	0.011	No
Benzo(a)Anthracene	0.049	CTR (#60)	<5	0.0053	Yes[5]
Benzo(a)Pyrene	0.049	CTR (#61)	<5	0.00029	Yes[5]
Benzo(b)Fluoranthene	0.049	CTR (#62)	<5	0.0046	Yes[5]
Benzo(k)Fluoranthene	0.049	CTR (#64)	<5	0.0015	Yes[5]
Chrysene	0.049	CTR (#73)	<5	0.0024	Yes[5]
Dibenzo(a,h)Anthracene	0.049	CTR (#74)	<5	0.00064	Yes[5]
Indeno(1,2,3-cd)Pyrene	0.049	CTR (#92)	<5	0.004	Yes[5]
PCBs (Sum)*	0.00017	CTR (#119-125)	0.00017	Not available (NA)	Yes
CTR #s 1, 3, 5a, 12, 15, 17-126 except, 60-62, 64, 73, 74, , 92, 109 and 111	Various or NA	CTR	Non-detect, less than WQC, or no WQC	Less than WQC or Not Available	No or Undetermined[6]

1. * = Constituents on 303(d) list, applies WHO 1998 to Toxicity Equivalent Factors (TEQ) of 2,3,7,8-TCDD.
2. RPA based on the following: Hardness (H) is based on the lowest ambient hardness, 46 in mg/L as $CaCO_3$; BP = Basin Plan; CTR = California Toxics Rule; NTR=National Toxics Rule; fw = freshwater; sw = saltwater; T = translator to convert dissolved to total copper.
3. Translators are based on the CTR.
4. Dieldrin and 4, 4'-DDE: RPA = Yes, based on B > WQO.
5. Limits for each of these parameters are included because PAHS are in crude oil processed by all refineries and are manufactured in the refinery process. Consistent with trigger 3 as defined in Finding 35, reasonable potential exists for these constituents and WQBELs are required.
6. Undetermined due to lack of background data, lack of objectives/criteria, or lack of effluent data (See Fact Sheet Table for full RPA results).

38. *RPA Results for Impairing Pollutants.* While TMDLs and WLAs are being developed, effluent concentration limits are established in this permit for 303(d) listed pollutants that have reasonable potential to cause or contribute to an excursion above the water quality standard. In addition, mass limits are required for bioaccumulative 303(d) –listed pollutants that can be reliably detected. Constituents on the 303(d) list for which the RPA determined a need for effluent limitations are copper, mercury, nickel, selenium, 4,4'-DDE, Dieldrin, PCBs, and dioxin TEQ.

Interim Limits with Compliance Schedules

39. The Discharger has demonstrated infeasibility to meet the WQBELs calculated according to Section 1.4 of the SIP for copper, mercury, nickel, lead, dioxin TEQ, and selenium. Therefore, this Order establishes compliance schedules for these pollutants. For limits based on CTR or NTR criteria (e.g., copper and selenium), this Order establishes a 5-year compliance schedule as allowed by the CTR and SIP. For limits based on the Basin Plan numeric WQOs (e.g., mercury, and nickel), this Order establishes compliance schedules until March 31, 2010. For limits based on Basin Plan narrative WQOs (e.g., dioxin TEQ), this Order established a compliance schedule until ten years from the effective date of this Order. For cyanide, there is insufficient background data to calculate a true WQBEL, so this Order specifies a data collection period until May 18, 2003. The basis for these schedules is further described in the Fact Sheet.

Specific Pollutants

40. *Dioxin TEQ.*
    (1) The CTR establishes a numeric human health WQC of 0.014 picograms per liter (pg/l) for 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (2,3,7,8-TCDD) based on consumption of aquatic organisms.
    (2) The preamble of the CTR states that California NPDES permits should use toxicity equivalents (TEQs) where dioxin-like compounds have reasonable potential with respect to narrative criteria. The preamble further states that USEPA intends to use the 1998 World Health Organization Toxicity Equivalence Factor (TEF)[1] scheme in the future and encourages California to use this scheme in State programs. Additionally, the CTR preamble states USEPA's intent to adopt revised water quality criteria guidance subsequent to their health reassessment for dioxin-like compounds.
    (3) The SIP applies to all toxic pollutants, including dioxins and furans. The SIP requires a limit for 2,3,7,8-TCDD if a limit is necessary, and requires monitoring for a minimum of 3 years by all major NPDES dischargers for the other sixteen dioxin and furan compounds.
    (4) The Basin Plan contains a narrative WQO for bio-accumulative substances:
    "Many pollutants can accumulate on particulates, in sediments, or bio-accumulate in fish and other aquatic organisms. Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered."
    This narrative WQO applies to dioxin and furan compounds, based in part on the scientific community's consensus that these compounds associate with particulates, accumulate in sediments, and bio-accumulate in the fatty tissue of fish and other organisms.
    (5) The USEPA's 303(d) listing determined that the narrative objective for bio-accumulative pollutants was not met because of the levels of dioxins and furans in fish tissue.
    (6) The limited data collected to date show no detected values, but the levels of detection are above the CTR criteria. Dioxins and furans are found in catalytic reforming wastewaters at the refinery. Accordingly, there is a reasonable potential for dioxins to exist in the discharge at

[1] The 1998 WHO scheme includes TEFs for dioxin-like PCBs. Since dioxin-like PCBs are already included within "Total PCBs", for which the CTR has established a specific standard, dioxin-like PCBs are not included in this Order's version of the TEF scheme.

levels above the criteria and it is appropriate to include a water quality based effluent limitation for TCDD equivalents.

41. *Polychlorinated Biphenyl (PCBs).* To determine the concentrations of PCB congeners in the effluent of Bay area refineries, the San Francisco Estuary Institute used sensitive analytical techniques with large sample volumes to achieve low detection limits. It published the results of these analysis in *Polychlorinated Biphenyls in Northern San Francisco Estuary Refinery Effluents*, dated September 10, 2002, which indicates that Valero's effluent contained total PCBs ranging from 85 to 170 pg/L. As the MEC of PCBs in Valero's effluent equals the WQC for protecting human health, the discharge has a reasonable potential to cause exceedances of the WQC for PCBs. However, the methodology described above has not been approved by EPA, and therefore, cannot be used for compliance purposes. The Discharger has certified that the only known historical presence of PCBs was in sealed electrical transformers and there is no physical, written, or anecdotal evidence that transformers containing oil with PCBs ever leaked to ground surfaces within the facility. However, in the previous Order, the Board determined that there is reasonable potential for PCBs and the results from the above analysis suggest a reasonable potential exists. This reasonable potential is based on:
    - The historical presence of PCBs at the facility;
    - The detection limits for PCBs using approved EPA methods are above the WQC. Thus, PCBs maybe discharged at a level below the detection limits but above WQC; and
    - PCBs are persistent bioaccumulative toxicants that have impaired the receiving waterbody. In addition, the PCBs have been included in the 303(d) listing because of fish tissue contamination[2].

    As a result, this Order retains final WQBELs for total PCBs recalculated based on the CTR criteria. If analytical methodologies improve and the detection levels decrease to a point that show discharge concentrations above the final WQBELs limits in this Order, the Board will re-evaluate the Discharger's feasibility to comply with the limits and determine the need for a compliance schedule and interim performance limits at that time.

42. *Polynuclear Aromatic Hydrocarbons (PAHs).* The RPA was conducted on individual PAHs not total PAHs, as required by the SIP and CTR. No PAHs have been detected in the effluent. However, for some PAHs, the detection levels achieved by the Discharger are well above the applicable WQC. As PAHs are found in crude oil processed by the refinery and are manufactured in the refinery process, there is a reasonable potential for benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo (a,h) anthracene and indeno(1,2,3-cd) pyrene to be present in the discharge and effluent limits are required. If analytical methodologies improve and the detection levels decrease to a point that show discharge concentrations above the final limits in this Order, the Board will re-evaluate the Discharger's feasibility to comply with the limits and determine the need for a compliance schedule and interim performance limits at that time.

43. *Phenols.* In addition to addressing the mass loading of phenolic compounds as required by the effluent guidelines, the previous permit included a WQBEL for total phenols of 500 µg/L for protection of the narrative toxicity objective. The CTR and NTR specifies criteria for individual phenolic compounds, which are a subset of total phenols. The previous total phenols limit may be more restrictive for several phenolic compounds (e.g., phenol and 2,4-dimethylphenol) than the WQBELs calculated from the SIP owing to their high CTR and NTR criteria. However, for most of the phenolic compounds in the CTR and NTR, the WQBELs would be more restrictive. Retaining

[2] Contaminant Levels in Fish Tissue from San Francisco Bay, San Francisco Regional Water Quality Control Board (June 1997).

WQBELs for both total and individual phenolics would potentially limit and count the same pollutants twice. Despite this, this Order follows the requirements of the CTR, NTR and SIP and the Basin Plan Concerning the Basin Plan requirement, there is no reasonable potential for exceedance of the narrative toxicity objective due to total phenols. This is based on self-monitoring data from 1999 through 2001, that show the MEC for total phenols was 22 µg/L, which is much less than the Basin Plan discharge limit of 500 µg/L for protecting beneficial uses. Concerning the NTR and SIP, none of the individual phenolic compounds included in the NTR have been found in the effluent and there is no evidence to suggest elevated phenol levels in the discharge. There is currently no background data for specific phenolic compounds. Therefore, based on State Board's Order No. 2001-016 there is no reasonable potential. The Discharger will collect additional phenol compound data as required by the August 6, 2001 letter. The Order can be re-opened to establish limits if new data show there is reasonable potential for any phenolic compounds.

44. *4,4'-DDE and Dieldrin.* Board staff could not determine MECs for 4,4'-DDE and dieldrin because they were not detected in the effluent, and all of the detection limits are higher than lowest WQC (Section 1.3 of the SIP). Board staff conducted the RPA by comparing the WQC with RMP ambient background concentration data gathered using research-based sample collection, concentration, and analytical methods. The RPA indicates that 4,4'-DDE and dieldrin have reasonable potential, and numeric WQBELs are required.

45. The current 303(d) list includes Suisun Bay and the Carquinez Strait as impaired for dieldrin and DDT; 4,4'-DDE is chemically linked to the presence of DDT. The Board intends to develop TMDLs that will lead towards overall reduction of dieldrin and 4,4'-DDE. The WQBELs specified in this Order may be changed to reflect the WLAs from this TMDL. Studies are ongoing to investigate the feasibility and reliability of different methods of increasing sample volumes to lower the detection limits for pesticides. If analytical methodologies improve and the detection levels decrease to a point that show discharge concentrations above the limits in this Order, the Board will re-evaluate the Discharger's feasibility to comply with the limits and determine the need for a compliance schedule and interim performance limits at that time. Since dieldrin and 4,4'-DDT are bioaccumulative and on the 303(d) list due to fish tissue concentrations, there is no assimilative capacity, and no dilution credit was allowed in the final limit calculations.

46. *Toluene, Benzene, and Fluoranthene.* The previous Order contained effluent limits for toluene, benzene, and fluoranthene. As indicated in an earlier finding, these constituents do not have a reasonable potential to cause an exceedance of their respective WQC. Accordingly, this Order does not propose to include effluent limitations for these constituents.

47. *Other organics.* The Discharger has performed sampling and analysis for the organic constituents listed in the CTR. This data set was used to perform the RPA. The full RPA is presented as an attachment in the Fact Sheet. In most cases (about 100 out of the 126 priority pollutants), reasonable potential cannot be determined because detection limits are higher that the lowest WQC, and/or ambient background concentrations are not available. The Discharger will continue to monitor for these constituents in the effluent and the receiving water using analytical methods that provide the best feasible detection limits. When additional data become available, further RPA will be conducted to determine whether to add numeric effluent limitations to the Order or to continue monitoring.

48. *Effluent Monitoring.* This Order does not include effluent limitations for constituents that do not show reasonable potential, but continued monitoring for these pollutants is required as described in the August 6, 2001 letter, which is further described in a later finding. If concentrations of these constituents increase significantly the Discharger will be required to investigate the source of the

increases and establish remedial measures if the increases result in reasonable potential to cause or contribute to an excursion above the applicable WQO/WQC.

49. *Permit Reopener.* The Order includes a reopener provision to allow numeric effluent limitations to be added or deleted in the future for any constituent that exhibits or does not exhibit, respectively, reasonable potential. The Board will make this determination based on monitoring results.

Development of Effluent Limitations

Copper

50. *Copper Water Quality Criteria.* The saltwater criteria for copper in the adopted CTR are 3.1 µg/L for chronic protection and 4.8 µg/L for acute protection. Included in the CTR are translator values to convert the dissolved criteria to total criteria. The Discharger may also perform a translator study to determine a more site-specific translator. The SIP, Section 1.4.1, and the June 1996 USEPA guidance document, entitled *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion,* describe this process and provide guidance on how to establish a site-specific translator. Using the CTR translator, translated criteria of 3.7 µg/L for chronic protection and 5.8 µg/L for acute protection were used to calculate effluent limitations.

51. *Water Effects Ratios.* The CTR provides for adjusting the criteria by deriving site-specific objectives (SSOs) through application of the water-effect ratio (WER) procedure. The USEPA includes WERs to assure that the metals criteria are appropriate for the chemical conditions under which they are applied. A WER accounts for differences between a metal's toxicity in laboratory dilution water and its toxicity in water at the site. The USEPA's February 22, 1994 Interim Guidance on Determination and Use of Water Effects Ratios for Metals superseded all prior USEPA guidance on this subject. The Discharger, through its participation with WSPA and BACWA, has initiated a study together with the Board to determine a SSO for copper in the north bay reaches including Suisun Bay. This study is on going and is expected to be completed in several years.

52. *Copper Effluent Limitations.* Based on the RPA, there is reasonable potential for exceedances of the WQC for copper in the subject discharge. The final WQBEL for copper will be based on the WLA contained in a TMDL. Alternatively, the copper WQBEL may be developed consistent with SIP procedures in Section 5.2 if the impairment studies support adoption of a SSO. If the 303(d) listing process in 2002 concludes that Suisun Bay is not impaired by copper, then a de-listing of the Bay for copper will result. Interim effluent limitations are required for copper since the Discharger has demonstrated that the calculated WQBELs presented in the Fact Sheet, as a point of reference (AMEL of 11 µg/L and MDEL of 27 µg/L) will be infeasible to meet. Board staff considered self-monitoring data from 1999-2001 (copper concentrations ranged from < 10 µg/L to 35.2 µg/L). However, the data only contained 11 detected values out of 36 samples, and therefore, it was not possible to perform a meaningful statistical evaluation of current treatment performance. The SIP requires the interim numeric effluent limit for the pollutant be based on either current treatment facility performance, or on the previous Order's limitation, whichever is more stringent. As current sample results for copper are not sufficient to perform a meaningful analysis, this Order retains the copper limit of 36 µg/L from the previous permit.

53. *Copper Source Control.* This Order requires the Discharger to develop pollution prevention and source control programs to maximize practicable control over copper sources in the refinery.

Lead

54. *Lead Water Quality Objectives/Criteria.* To protect fresh water aquatic life at a hardness of 46 mg/L, the Basin Plan specifies objectives for lead of 1.2 µg/L as a 4-day average and 30.4 µg/L as a 1-hour average.

55. *Lead Effluent Limitations.* Based on the RPA, there is reasonable potential for exceedances of the WQO for lead in the subject discharge. Interim effluent limitations are required for lead since the Discharger has demonstrated that it is infeasible to meet the final WQBEL of AMEL 3.9 µg/L, MDEL 7.9 µg/L. Board staff considered self-monitoring data from 1999-2001 (lead concentrations ranged from < 3 µg/L to 8 µg/L) to develop an interim performance-based limit. However, the data only contained seven detected values out of 36 samples, and therefore, it was not possible to perform a meaningful statistical evaluation of current treatment performance. The reported detection limits were generally higher than those currently available. The previous permit does not include a lead effluent limit. As discussed in Findings 96 and 97, the Discharger will collect additional effluent data, as required by the August 6, 2001 letter from the Board to all permittees. For most parameters, monthly monitoring is required. For lead, this Order specifically requires weekly monitoring with a detection limit lower than previously used by the Discharger and lower than the water quality objective. This will provide sufficient data for the Board to evaluate treatment performance and develop interim limits, as necessary. The permit will be re-opened to include such interim limitations when established. Additionally, since there is no TMDL or site-specific objective development on going for lead, the final WQBELs will not change significantly in the foreseeable future. Consistent with State Board Order WQO 2002-0012 regarding remand of the Permit for the East Bay Municipal Utility District, this Order specifies a compliance schedule with interim tasks for achieving compliance with the final limits, and a reopener provision to include additional interim tasks.

56. *Lead Source Control.* This Order requires the Discharger to develop pollution prevention and source control programs to maximize practicable control over lead sources in the refinery. It further requires the Discharger to propose any additional measures or investigations that are necessary to identify sources for reduction to comply with the final limits by March 31, 2010.

Mercury

57. *Mercury Water Quality Objectives/Criteria.* Both the Basin Plan and CTR include objectives/criteria that govern mercury in the receiving water. The Basin Plan specifies objectives for the protection of aquatic life in salt water of 0.025 µg/L as a 4-day average and 2.1 µg/L as a 1-hour average. The CTR specifies a long-term average criterion for protection of human health of 0.051 µg/L.

58. *Mercury TMDL.* The current 303(d) list includes the receiving waters as impaired by mercury, due to high mercury concentrations in the tissue of fish from the Bay. Methyl-mercury is a persistent bioaccumulative pollutant. The Board intends to establish a TMDL that will lead towards overall reduction of mercury mass loadings into the San Francisco Bay watershed. The final mercury limitation will be based on the Discharger's WLA in the TMDL, and the permit will be revised to include the final water quality-based effluent limit as an enforceable limitation.

59. *Mercury Control Strategy.* Board staff is developing a TMDL to control mercury levels in San Francisco Bay. The Board, together with other stakeholders, will cooperatively develop source control strategies as part of TMDL development. The currently preferred strategy is applying interim mass loading limits to point source discharges while focusing mass reduction efforts on other more significant and controllable sources. While the TMDL is being developed, the Discharger will cooperate in maintaining ambient receiving water conditions by complying with performance-based

mercury mass emission limits. Therefore, this Order includes interim concentration and mass loading effluent limitations for mercury, as described in the paragraphs below. The Discharger is further required to implement source control measures as also described below.

60. *Concentration-Based Mercury Effluent Limitations.* Based on the RPA, there is reasonable potential for exceedances of the WQO for mercury in the 001 discharge. The final WQBELs for mercury will be based on the WLA contained in a TMDL. Interim effluent limitations are necessary for mercury since the Discharger has demonstrated that the calculated WQBELs presented in the Fact Sheet as a point of reference (AMEL of 0.02 µg/L and MDEL of 0.04 µg/L) will be infeasible to meet. Effluent data for the Discharger's facility are limited because only since 2000 have refineries begun using ultra-clean methods to analyze for mercury. Board staff performed a statistical analysis of "low detection limit" (ultraclean) mercury data pooled from the refinery dischargers in the Region. The purpose of the study was to evaluate the feasibility of establishing a region-wide interim performance-based effluent limitation for mercury. In light of the similarities between refineries regarding the nature of their process wastes and treatment technologies involved, it is reasonable to pool the ultraclean mercury data from the refineries to enable a statistical approach to setting an interim limit based on best available information and performance. Statistical analysis from this pooled data set results in a uniform, performance-based interim, monthly average mercury effluent limit of 0.075 µg/L that is applicable to refinery discharges. The previous Order includes a monthly average limit of 0.21 µg/L and a daily average limit 1 µg/L. Effluent mercury concentrations from 1999-2001 ranged from 0.0052 µg/L to 0.053 µg/L (36 samples).

61. *Mass-Based Mercury Effluent Limitation.* Mercury is a priority toxic pollutant. It has several forms, the most toxic of which is methylmercury. Various biological and chemical processes can cause mercury discharged to water to react with organic matter to form methylmercury. Methylmercury is readily taken up by plants and animals. It bioaccumulates through the food chain. Consequently, the mercury concentration in predators at the top of the food chain, such as predatory fish, can be thousands or even millions of times greater than the concentration in water. San Francisco Bay is one of the environments known to favor the production of methylmercury. Based on calculated pilot study screening values, mercury is a chemical of concern in the Bay.[3] Accordingly, Board staff did not grant a dilution credit for mercury in calculating final water quality based effluent limits. This Order establishes a mercury mass-based effluent limitation of 0.014 kilograms per month. This mass-based effluent limitation was calculated statistically using effluent flow and mercury concentration data from 1999-2001. This mass based effluent limitation maintains current loadings until a TMDL is established and is consistent with state and federal antidegradation and antibacksliding requirements. The final mass based effluent limitation will be based on the WLA derived from the mercury TMDL.

62. *Mercury Source Control.* This Order requires the Discharger to develop pollution prevention and source control programs to maximize practicable control over mercury sources in the refinery.

Nickel

63. *Nickel Water Quality Objectives.* The Basin Plan contains a numeric WQO for nickel for protection of aquatic life in salt water of 7.1 µg/L as a 24-hour average and 140 µg/L as an instantaneous maximum.

64. *Nickel Effluent Limitations.* Based on the RPA, there is reasonable potential for exceedances of the WQO for nickel in the subject discharge. The final WQBELs for nickel will be based on the WLA contained in a TMDL or an SSO, if developed. Interim effluent limitations are required for nickel

[3] Contaminant Concentrations in Fish from San Francisco Bay 1997 (May 1997).

since the Discharger has demonstrated that the calculated WQBELs presented in the Fact Sheet as a point of reference (AMEL of 30.7 µg/L and MDEL of 62.5 µg/L) will be infeasible to meet. Self-monitoring data from 1999 to 2001 indicate that effluent nickel concentrations ranged from < 5 µg/L to 76 µg/L and that 25 out of 153 data points (16.3%) were nondetect. Board staff calculated an interim performance-based limit of 70.6 µg/L (3 standard deviations above the mean), which exceeds the limit of 65 µg/L contained in the previous permit. To comply with antibacksliding requirements, this Order retains the nickel limit from the previous permit.

65. *Nickel Source Control.* This Order requires the Discharger to develop pollution prevention and source control programs to maximize practicable control over nickel sources in the refinery.

Selenium

66. *Selenium Water Quality Criteria.* Selenium criteria were promulgated in the NTR for specific waters, which include Suisun Bay. The NTR established a Criterion Chronic Concentration (CCC) for the protection of aquatic life of 5 µg/L and a Criterion Maximum Concentration (CMC) for the protection of aquatic life of 20 µg/L.

67. *Background.* On February 20, 1991, and June 19, 1991, the Board adopted Order Nos. 91-026 and 91-099, respectively, amending the NPDES permits for all six refineries in the region, including the Discharger, to add concentration and mass emission limitations for selenium. Order No. 91-026 specified a limit of 50 µg/L as a daily maximum limit. Order No. 91-099 specified a limit of 0.96 lbs/day as a running annual average by December 12, 1993.

68. On October 16, 1992, the Western States Petroleum Association (WSPA) filed a Petition with the Superior Court for the County of Solano on behalf of the six oil refineries seeking to set aside Order Nos. 91-026 and 91-099. On January 19, 1994, the Board adopted Resolution No. 94-016, which approved a Settlement Agreement between WSPA and the Board. The Settlement Agreement adopted the limits included in Orders 91-026 and 91-099. The previous Order includes the daily maximum concentration limit of 50 µg/L and a more stringent annual average mass emission limit of 0.96 lb/day.

69. *Concentration and Mass-based Selenium Effluent Limitations.* Based on the RPA, there is reasonable potential for exceedances of the WQC for selenium in the subject discharge. The final WQBELs for selenium will be based on the WLA contained in a TMDL, if developed. Interim effluent limitations are required for selenium since the Discharger has demonstrated that the calculated WQBELs presented in the Fact Sheet as a point of reference (AMEL of 4.5 µg/L and MDEL of 6.7 µg/L) will be infeasible to meet. The interim mass emission (0.96 lb/day) and concentration (50 µg/L) for selenium are based on the Settlement Agreement between WSPA and the Board.

70. *Selenium Source Control.* This Order requires the Discharger to develop pollution prevention and source control programs to maximize practicable control over selenium sources in the refinery.

Zinc

71. *Zinc Water Quality Objectives.* To protect fresh water aquatic life at a hardness of 46 mg/L, the Basin Plan specifies objectives for zinc of 55 µg/L as a 4-day average and 61 µg/L as a 1-hour average.

72. *Zinc Effluent Limitations.* Based on the RPA, there is reasonable potential for exceedances of the WQO for zinc in the subject discharge. The calculated final WQBELs for zinc are: AMEL of

245 µg/L and MDEL of 565 µg/L. Self-monitoring data from 1999 through 2001 indicates that effluent zinc concentrations ranged from < 5 µg/L to 102 µg/L.

Cyanide

73. *Cyanide Water Quality Objectives/Criteria.* NTR specifies a CMC and CCC of 1 µg/L for cyanide in waters of the State defined as bays or estuaries including the San Francisco Bay upstream to and including Suisun Bay and the Sacramento San Joaquin Delta. These criteria values are below the presently achievable reporting limits for this discharge (all samples with a detection limit of 10 µg/L).

74. *Cyanide Effluent Limitations.* Based on the RPA, cyanide was found to have reasonable potential to cause or contribute to an excursion above WQOs/WQC. Cyanide is a regional problem associated with the analytical protocol for cyanide analysis due to matrix inferences. A body of evidence exists to show that cyanide measurements in effluent may be an artifact of the analytical method. This question is being explored in a national research study sponsored by the Water Environment Research Foundation (WERF).

    A regional discharger-funded study is underway for development of a cyanide SSO or recalculation of the criteria. The cyanide study plan was submitted on October 29, 2001. The final report is to be submitted to the Board by June 30, 2003. There is insufficient cyanide background data currently available to calculate a WQBEL. Ambient cyanide data are being collected as required by the August 6, 2001 letter. The WQBELs will be calculated based on additional ambient background information, and/or a cyanide SSO or updated criteria. Pursuant to Section 2.2.2 of SIP, this Order specifies a data collection period. Until sufficient data is collected, an interim limit is necessary. Board staff considered self-monitoring data from 1999-2001 (cyanide concentrations ranged from < 10 µg/L to 50 µg/L) to develop an interim performance-based limit. However, the data only contained six detected values out of 153 samples, and therefore, it was not possible to perform a meaningful statistical evaluation of current treatment performance. As the previous Order includes a cyanide effluent limit of 25 µg/L and MEC is 50 µg/L, it is appropriate to set the interim limit at 25 µg/L.

Chromium (VI)

75. *Chromium (VI) Water Quality Objective.* The Basin Plan contains a numeric WQO for chromium (VI) of 11 µg/L.

76. *Chromium (VI) Effluent Limitations.* Based on the RPA, there is reasonable potential for exceedances of the WQO for chromium (VI) in the subject discharge. The calculated final WQBELs for chromium (VI) are: AMEL of 58 µg/L and MDEL of 116 µg/L. Additionally, this Order includes technology-based mass limitations for chromium (VI) and total chromium. Self-monitoring data from 1999 through 2001 indicate that effluent chromium (VI) concentrations ranged from < 5 µg/L to 18 µg/L.

4,4'-DDE and Dieldrin

77. *Water Quality Criteria.* In the CTR, the lowest criteria for 4,4'-DDE and dieldrin are the human health values of 0.00059 µg/L and 0.00014 µg/L, respectively. These criteria are well below the Minimum Levels (MLs) of 0.05 µg/L and 0.01 µg/L, respectively, identified in Appendix 4 of the SIP.

78. *4,4'-DDE and Dieldrin Effluent Limitations.* This Order contains 4,4'-DDE and dieldrin WQBELs because based on the RPA, there is reasonable potential for exceedances of the WQC for 4,4'-DDE

and dieldrin. The Board intends to establish a TMDL that will lead towards overall reduction of 4,4'-DDE and dieldrin mass loadings into Carquinez Strait and Suisun Bay. If the Discharger is found to be contributing to 4,4'-DDE and dieldrin impairment in Carquinez Strait and Suisun Bay, the final effluent limitations will be based on the Discharger's WLA in the TMDL. 4,4'-DDE and Dieldrin are bioaccumulative and on the 303(d) list because of fish tissue concentrations. Therefore, there is no assimilative capacity and no dilution credit was allowed in the final limit calculations. Compliance will be demonstrated by showing no detection below the SIP MLs (0.05 µg/L for 4,4'-DDE and 0.01 µg/L for dieldrin).

79. *Treatment Plant Performance and Compliance Attainability.* Effluent data for 4,4'-DDE and dieldrin consist of one sample each, <0.04 µg/L and <0.02 µg/L, respectively. Because 4,4'-DDE and dieldrin have not been detected in the effluent and there are no known sources of 4,4'-DDE and dieldrin at the Discharger's facility, the Discharger should be able to comply with the compliance levels (minimum levels) established in the SIP based on available analytical limits. Therefore, this Order includes final effluent limitations for 4,4'-DDE and dieldrin.

Dioxins and Furans

80. *Numerical Water Quality Criteria.* The CTR establishes a numeric human health WQC of 0.014 picograms per liter (pg/l) for 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (2,3,7,8-TCDD) based on consumption of aquatic organisms. A finding above discusses the use of TEQ's for other dioxin-like compounds, the RPA procedures, and SIP requirements. Board staff will use TEQs to translate the narrative WQOs to numeric WQOs for the other 16 congeners.

81. The dioxin congener 2,3,7,8-TCDD is the most potent animal carcinogen (USEPA, 1987d). Based on calculated pilot study screening values, dioxins and furans are chemicals of concern in the San Francisco Bay.[4]

82. Dioxins and furans are known to form during the regeneration of catalytic reformers and the Discharger's wastewater from caustic washes in the catalytic reforming process can contain dioxins and furans. Therefore, there is reasonable potential for 2,3,7,8-TCDD. The TCDD equivalent effluent limits calculated according to the SIP methodology are: AMEL of 0.014 pg/L and MDEL of 0.028 pg/L, which is lower than the current average monthly limit of 0.14 pg/L. Currently, it is not possible to determine compliance with dioxin limits as (a) analytical reporting limits available from commercial laboratories using approved EPA protocols are not low enough and (b) the SIP does not specify MLs for dioxins. The final limit for dioxins will likely be based on the WLA from the TMDL. This Order includes an interim limit for TCDD Equivalent of 0.14 pg/L, which is based on the previous permit. If analytical methodologies improve and the detection levels decrease to a point that show discharge concentrations above the interim limit in this Order, the Board will re-evaluate the Discharger's feasibility to comply with interim limits and determine the need for a compliance schedule at that time.

Municipal and industrial sources are very small contributors of the dioxins and furans load to the Bay, and the dominant sources are from current and historical air emissions. Because of this, it is unlikely that the TMDL will require reduction efforts beyond the controls required by this permit.

83. To assist in developing the TMDL, the Discharger has the option to participate in a special study, through the RMP, to investigate the feasibility and reliability of different methods of increasing

[4] Contaminant Levels in Fish Tissue from San Francisco Bay, San Francisco Regional Water Quality Control Board (May 1997).

sample volumes to lower the detection limits for these dioxin and furan compounds and apply to have the preferred method approved by the USEPA.

PAHs

84. *Water Quality Criteria.* The CTR contains numeric water quality criteria for a number of individual PAHs of 0.049 µg/L.

85. *PAH Effluent Limitations.* As discussed in an earlier finding, there is reasonable potential for benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo (a,h) anthracene, and indeno(1,2,3-cd)pyrene and WQBELs are required. The final effluent limitations for each of these parameters are: AMEL of 0.049 µg/L and MDEL of 0.098 µg/L, which replace the previous permit's total PAH effluent limit of 0.49 µg/L. Since the limits are lower than the MLs included in the SIP, compliance will be shown by no detection at these MLs. Self-monitoring data from 1999-2001 indicate that the Discharger has never detected PAHs in effluent (< 5 µg/L).

PCBs

86. *Water Quality Criteria.* The CTR contains a numeric water quality criterion of 0.00017 µg/L for the sum of seven individual PCB compounds.

87. *PCB Effluent Limitations.* The previous Order includes total PCB limits of 0.007 µg/L (monthly average) and 0.3 µg/L (daily average) developed based on BPJ. Self-monitoring data from 1999-2001 indicates that effluent concentrations for the seven PCB compounds have been reported as < 1.0 µg/L, which is above the WQC. Effluent limitations (AMEL of 0.00017 µg/L and 0.00034 µg/L) have been calculated according to the SIP methodology. Compliance will be demonstrated by showing no detection of any PCBs above the SIP ML of 0.5 µg/L. Final limits for PCBs may be revised based on the WLA included in a TMDL.

Whole Effluent Acute Toxicity

88. This Order includes effluent limits for whole effluent acute toxicity. Compliance evaluation is based on 96-hour flow through or static bioassays. USEPA promulgated updated test methods for acute and chronic toxicity bioassays on October 16, 1995, in 40 CFR Part 136. The Discharger indicates that it has resolved technical issues and that it can implement the new procedures, referred to as the 4th Edition. The previous Order included acute toxicity testing requirements and limits. These limits remained unchanged in this Order. During 2001-2002, the eleven sample median survival was 85-100 percent. The 90th percentile survival was 75-100 percent. These data comply with effluent limitations.

Whole Effluent Chronic Toxicity

89. *Program History.* The Basin Plan contains a narrative toxicity objective stating that "All waters shall be maintained free of toxic substances in concentrations that are lethal to or produce other detrimental responses to aquatic organisms" and that "there shall be no chronic toxicity in ambient waters" (BP, page 3-4). In 1986, the Board initiated the Effluent Toxicity Characterization Program (ETCP), with the goal of developing and implementing toxicity limits for each discharger based on actual characteristics of both receiving waters and waste streams. Dischargers were required to monitor their effluent using critical life stage toxicity tests to generate information on toxicity test species sensitivity and effluent variability to allow development of appropriate chronic toxicity effluent limitations. In 1988 and 1991, selected dischargers conducted two rounds of effluent characterization. A third round was completed in 1995, and the Board is evaluating the need for an additional round. Board guidelines for conducting toxicity tests and analyzing results were published in 1988 and last updated in 1991.

90. Order 96-068 specified a numeric limit for chronic toxicity based on assessment of the information from the ETCP and to implement the Basin Plan's narrative objective for toxicity. Order No. 96-068 required the Discharger to perform concurrent toxicity testing with *Holmesimysis costata* and *Mysidopsis bahia* to determine the most appropriate and sensitive organism for chronic toxicity testing and compliance determination. Additionally, Order No. 96-098 required an effluent chronic toxicity testing screening program as part of the Discharger's application for permit reissuance to identify the most sensitive species. The Discharger submitted a report dated November 2000 presenting the results of these tests. While the study results indicated that *Ceriodaphnia dubia* is the most sensitive species, the report explained that low salt levels in Valero's effluent (conductivity ranging from 2,300 to 3,200 µmhos/cm) adversely affected *Ceriodaphnia dubia*. As the Discharger, typically discharges into a highly saline water system, the report indicates that it is more appropriate for Valero to perform chronic toxicity monitoring on *Mysidopsis bahia*.

91. In accordance with the toxicity testing requirements established in Order 96-068, the Discharger has conducted toxicity testing. Chronic toxicity testing data collected in 2001 indicate an eleven sample median value of 1.53 TU_c, and a 90th percentile value of 4 TU_c. These results are below the permit limits of 10 and 20 TU_c, respectively.

Pollutant Prevention and Pollutant Minimization

92. The Discharger has established a Pollution Prevention Program under the requirements specified by the Board.
    a. Section 2.4.5 of the SIP specifies under what situations and for which priority pollutant(s) (i.e., reportable priority pollutants) the Discharger shall be required to conduct a Pollutant Minimization Program in accordance with Section 2.4.5.1.
    b. There may be some redundancy required between the Pollution Prevention Program and the Pollutant Minimization Program.
    c. Where the two programs' requirements overlap, the Discharger is allowed to continue/modify/expand its existing Pollution Prevention Program to satisfy the Pollutant Minimization Program requirements.
    d. For copper, lead, mercury, nickel, and selenium, the Discharger will conduct any additional source control measures described in the Discharger's infeasibility report submitted on July 15, 2002, in accordance with California Water Code 13263.3 and Section 2.1 of the SIP. Section 13263.3(d)(1)(C) establishes a separate process outside of the NPDES permit process for preparation, review, approval, and implementation of pollution minimization measures.

93. The Board staff intends to require an objective third party to establish model programs, and to review program proposals and reports for adequacy. This is to encourage use of Pollution Prevention and does not abrogate the Board's responsibility for regulation and review of the Discharger's Pollution Prevention Program. Board staff will work with the Discharger and other dischargers to identify the appropriate third party for this effort.

Requirement for Monitoring of Pollutants in Effluent and Receiving Water to Implement New Statewide Regulations and Policy

94. *Insufficient Effluent and Ambient Background Data.* Board staff's review of the effluent and ambient background monitoring data found that there were insufficient data to determine reasonable potential and calculate numeric WQBELs, where appropriate, for most pollutants listed in the SIP.

95. *SIP- Required Dioxin study.* The SIP states that each Board shall require major and minor POTWs and industrial dischargers in its region to conduct effluent monitoring for the 2,3,7,8-TCDD congeners whether or not an effluent limit is required for 2,3,7,8-TCDD. The monitoring is intended to assess the presence and amounts of the congeners being discharged to inland surface waters, enclosed bays, and estuaries. The Boards will use these monitoring data to establish strategies for a future multi-media approach to control these chemicals.

96. On August 6, 2001, the Board sent a letter to all the permitted dischargers pursuant to Section 13267 of the California Water Code requiring the submittal of effluent and receiving water data on priority pollutants. This formal request for technical information addresses the insufficient effluent and ambient background data, and the dioxin study. The letter (described above) is referenced throughout the permit as the "August 6, 2001 Letter".

97. Pursuant to the August 6, 2001 Letter from Board Staff, the Discharger is required to submit workplans and sampling results for characterizing the levels of selected constituents in the effluent and ambient receiving water.

98. *Monitoring Requirements (Self-Monitoring Program).* The SMP includes monitoring at the outfalls for conventional, non-conventional, and toxic pollutants, and acute and chronic toxicity. For a number of constituents that the Board has granted interim limits (copper, nickel, selenium, and cyanide), this Order contains weekly monitoring. The two exceptions to this requirement are mercury and dioxin. Additional cost and effort is required for ultra-clean mercury monitoring, thus this Order requires monthly monitoring. For dioxins and furans, due to the considerable costs and the non-detects the Discharger has found, this Order requires twice yearly monitoring, which is also consistent with the SIP. In order to determine an appropriate performance based interim limit for lead, this Order requires weekly monitoring at a detection limit below the most stringent water quality objective. Additionally, this Order requires monthly monitoring for individual PAHs to demonstrate compliance with final effluent limits. This is consistent with the previous monthly monitoring required to demonstrate compliance with the total PAH limitation. Further, this Order requires twice yearly monitoring for PCBs, dieldrin and 4,4'-DDE to demonstrate compliance with final effluent limitations. In lieu of near field discharge specific ambient monitoring, it is acceptable that the Discharger participate in collaborative receiving water monitoring with other dischargers under the provisions of the August 6, 2001 letter, and the RMP.

99. *Optional Mass Offset.* This Order contains requirements to prevent further degradation of the impaired waterbody. Such requirements include the adoption of interim mass limits that are based on treatment plant performance, provisions for aggressive source control, feasibility studies for wastewater reclamation, and treatment plant optimization. After implementing these efforts, the Discharger may find that further net reductions of the total mass loadings of the 303(d)-listed pollutants to the receiving water can only be achieved through a mass offset program. This Order includes an optional provision for a mass offset program.

Storm Water

100. The Discharger is required to continue to update and maintain its storm water pollution prevention plan (SWPPP) for the entire facility.

101. This Order retains the existing Order's effluent limitations for Outfalls 002-016 and establishes limitations for outfall 017.

102. Elevated levels of TSS have been detected in storm water outfalls as shown in Finding 5 above. Both the CTR and Basin Plan indicate that storm water discharges are best controlled through the

design and implementation of technologically and economically feasible best management practices (BMPs) rather than establishing numeric effluent limitations. The Discharger should indicate the high sources of sediment in its SWPPP an annual report and propose BMPs with an implementation schedule, if appropriate, to address these sources.

Other Discharge Characteristics and Permit Conditions

103. *NPDES Permit.* This Order serves as an NPDES Permit, adoption of which is exempt from the provisions of Chapter 3 (commencing with Section 21100) of Division 13 of the Public Resources Code [California Environmental Quality Act (CEQA)] pursuant to Section 13389 of the California Water Code.

104. *Notification.* The Discharger and interested agencies and persons have been notified of the Board's intent to reissue requirements for the existing discharges and have been provided an opportunity to submit their written views and recommendations. Board staff prepared a Fact Sheet and Response to Comments, which are hereby incorporated by reference as part of this Order.

105. *Public Hearing.* The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to the provisions of Division 7 of the California Water Code, regulations, and plans and policies adopted thereunder, and to the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, that the Discharger shall comply with the following:

A. DISCHARGE PROHIBITIONS

1. Discharge of treated wastewater at a location or in a manner different from that described in this Order is prohibited.

2. Discharge of process wastewater at any point where it does not receive an initial dilution of at least 10:1 is prohibited.

3. The bypass or overflow of untreated or partially treated process wastewater to waters of the State, either at the treatment plant or from the collection system is prohibited.

B. EFFLUENT LIMITATIONS

Production-Based Mass Emission Limits

1. a. The discharge at Outfall 001 (before the Discharger completes its planned expansion and before it treats asphalt plant wastewater) containing constituents in excess of any of the following mass loading limits, is prohibited:

Constituent	Units	Monthly Average	Daily Maximum
BOD_5	lb/day	1,400	2,500
	kg/day	640	1,200
TSS	lb/day	1,100	1,800
	kg/day	510	800
COD	lb/day	9,900	19,000
	kg/day	4,500	8,600
Oil & Grease	lb/day	410	770

Constituent	Units	Monthly Average	Daily Maximum
	kg/day	190	350
	mg/L	8.0	15
Phenolic Compounds	lb/day	9.3	19
	kg/day	4.2	8.6
Ammonia as N	lb/day	770	1,700
	kg/day	350	770
Sulfide	lb/day	7.5	17
	kg/day	3.4	7.6
Settleable Solids	mL/L	0.1	0.2
Total Chromium	lb/day	14	39
	kg/day	6.3	18
Hexavalent Chromium[1]	lb/day	1.1	2.6
	kg/day	0.51	1.2

1. b. *Alternate limits with increased throughput.* Once the Discharger satisfies Provisions D.3 (it certifies that refinery crude throughput has increased), the discharge at Outfall001 containing constituents in excess of any of the following mass loading limits, is prohibited:

Constituent	Units	Monthly Average	Daily Maximum
BOD_5	lb/day	1,800	3,200
	kg/day	810	1,500
TSS	lb/day	1,400	2,200
	kg/day	650	1,000
COD	lb/day	12,000	24,000
	kg/day	6,000	11,000
Oil & Grease	lb/day	520	970
	kg/day	240	440
	mg/L	8.0	15
Phenolic Compounds	lb/day	12	24
	kg/day	5.4	11
Ammonia as N	lb/day	970	2,100
	kg/day	440	970
Sulfide	lb/day	9.4	21
	kg/day	4.3	9.5
Settleable Solids	mL/L	0.1	0.2
Total Chromium	lb/day	18	49
	kg/day	8.2	22
Hexavalent Chromium[1]	lb/day	1.5	3.3
	kg/day	0.67	1.5

1 c. *Alternative limits with asphalt plant wastewater.* Once the Discharger satisfies Provisions D.4 (it certifies that asphalt plant wastewater is treated by its WWTP), the discharge at Outfall001 containing constituents in excess of any of the following mass loading limits, is prohibited:

Constituent	Units	Monthly Average	Daily Maximum
BOD_5	lb/day	1,800	3,300
	kg/day	830	1,500
TSS	lb/day	1,500	2,300
	kg/day	660	1,000
COD	lb/day	13,000	25,000
	kg/day	5,800	11,000
Oil & Grease	lb/day	530	1,000
	kg/day	240	450
	mg/L	8.0	15
Phenolic Compounds	lb/day	12	25
	kg/day	5.4	11
Ammonia as N	lb/day	1,000	2,200
	kg/day	450	990
Sulfide	lb/day	9.6	21.6
	kg/day	4.4	9.8
Settleable Solids	mL/L	0.1	0.2
Total Chromium	lb/day	14	42
	kg/day	6.4	19
Hexavalent Chromium[1]	lb/day	1.2	2.7
	kg/day	0.52	1.2

1. d. *Alternative limits with throughput increase and asphalt plant wastewater.* Once the Discharger satisfies Provisions D.3 and D.4, the discharge at Outfall001 containing constituents in excess of any of the following mass loading limits, is prohibited:

Constituent	Units	Monthly Average	Daily Maximum
BOD_5	lb/day	2,100	3,800
	kg/day	1,000	1,700
TSS	lb/day	1,700	2,700
	kg/day	770	1,200
COD	lb/day	15,000	28,000
	kg/day	6,700	13,000
Oil & Grease	lb/day	620	1,200
	kg/day	280	520
	mg/L	8.0	15
Phenolic Compounds	lb/day	14	29
	kg/day	6.3	13
Ammonia as N	lb/day	1,200	2,500
	kg/day	520	1,200
Sulfide	lb/day	11	25
	kg/day	5.1	11
Settleable Solids	mL/L	0.1	0.2
Total Chromium	lb/day	18	53
	kg/day	8.3	24
Hexavalent Chromium[1]	lb/day	1.5	3.4

Constituent	Units	Monthly Average	Daily Maximum
	kg/day	0.7	1.5

[1] The Discharger may, at its option, meet this limitation by measurement of total chromium.

Storm Water Runoff and Ballast Water Allocations

2. In addition to the monthly average and daily maximum pollutant weight allowances shown in B.1, allocations for pollutants attributable to storm water runoff and ballast water discharged as a part of Outfall 001 are permitted in accordance with the following schedules:

STORM WATER RUNOFF ALLOCATION

Constituent	Units	Monthly Average	Daily Maximum
BOD (5-day @ 20C)	mg/l	26	48
TSS	mg/l	21	33
COD	mg/l	180	360
Oil & Grease	mg/l	8	15
Phenolic Compounds	mg/l	0.17	0.35
Total Chromium	mg/l	0.21	0.60
Hexavalent Chromium	mg/l	0.028	0.062

BALLAST WATER ALLOCATION

Constituent	Units	Monthly Average	Daily Maximum
BOD (5-day @ 20C)	mg/l	26	48
TSS	mg/l	21	33
COD	mg/l	240	470
Oil & Grease	mg/l	8	15
pH		within the range of 6.0 to 9.0	

The total effluent limitation is the sum of the storm water runoff allocation, the ballast water allocation and the mass limits contained in B.1.

Toxic Pollutants

3. Whole Effluent Acute Toxicity

Representative samples of the discharge at outfall 001 shall meet the following limits for acute toxicity. Compliance with these limits shall be achieved in accordance with Provision D.10 of this Order:

a. The survival of bioassay test organisms in 96-hour bioassays of undiluted effluent shall be:
   (1) An eleven (11)-sample median value of not less than 90 percent survival; and
   (2) An eleven (11)-sample 90th percentile value of not less than 70 percent survival.

b. These acute toxicity limits are further defined as follows:
   (1) 11-sample median limit:
   Any bioassay test showing survival of 90 percent or greater is not a violation of this limit. A bioassay test showing survival of less than 90 percent represents a violation of this effluent limit, if five or more of the past ten or fewer bioassay tests also show less than 90 percent survival.
   (2) 90th percentile limit:
   Any bioassay test showing survival of 70 percent or greater is not a violation of this limit. A bioassay test showing survival of less than 70 percent represents a violation of this effluent limit, if one or more of the past ten or fewer bioassay tests also show less than 70 percent survival.

4. Chronic Toxicity
(a) The survival of bioassay test organisms in the discharge at outfall 001 shall be:
(1) An eleven sample median value of not less than10 TUc,
(2) An eleven sample 90-percentile value of not less than 20 TUc.

(b) These chronic toxicity limits are defined as follows:
(1) A test sample showing chronic toxicity greater than 10 TUc represent consistent toxicity and a violation of this limitation, if five or more of the past ten or less tests show toxicity greater than 10 TUc.
(2) A TUc equals 100/NOEL. The NOEL is the no observable effect level, determined from IC, EC, or NOEC values. These terms and their usage in determining compliance with the limitations are defined in the Attachment B of this Order. The NOEL shall be based on a critical life stage test using the most sensitive test species as specified by the Executive Officer. The Executive Officer may specify two compliance species if test data indicate that there is alternating sensitivity between the two species. If two compliance test species are specified; compliance shall be based on the maximum TUc value for the discharge sample based on a comparison of TUc values obtained through concurrent testing of the two species.
(3) A test sample showing chronic toxicity greater than 20 TUc represents a violation of this limitation if one or more of the past ten or less samples shows toxicity greater than 20 TUc.

5. **Toxic Substances**: The discharge at outfall 001 shall not exceed the following limits:

Constituent	Daily Max	Monthly Average	Interim Daily Maximum	Interim Monthly Average	Units	Notes
Chromium (VI)	120	58			µg/L	(1)
Copper			36		µg/L	(1)(2)
Mercury				0.075	µg/L	(1)(3)
Lead						(4)
Nickel			65		µg/L	(1)(5)

Constituent	Daily Max	Monthly Average	Interim Daily Maximum	Interim Monthly Average	Units	Notes
Selenium			50		µg/L	(1)(2)
Zinc	560	240			µg/L	(1)
Cyanide			25		µg/L	(1)(6)
4,4'-DDE	0.0012	0.00059			µg/L	(1)(7)
Dieldrin	0.00028	0.00014			µg/L	(1)(7)
Benzo(a)Anthracene	0.098	0.049			µg/L	(1)(7)
Benzo(a)Pyrene	0.098	0.049			µg/L	(1)(7)
Benzo(b)Fluoranthene	0.098	0.049			µg/L	(1)(7)
Benzo(k)Fluoranthene	0.098	0.049			µg/L	(1)(7)
Chrysene	0.098	0.049			µg/L	(1)(7)
Dibenzo(a,h)Anthracene	0.098	0.049			µg/L	(1)(7)
Indeno(1,2,3-cd)Pyrene	0.098	0.049			µg/L	(1)(7)
Total PCBs (Sum)	0.00034	0.00017			µg/L	(1)(7)(8)
TCDD Equivalents				0.14	pg/L	(1)(9)

Footnotes:

(1) (a) All analyses shall be performed using current USEPA methods, or equivalent methods approved in writing by the Executive Officer.

(b) Limits apply to the average concentration of all samples collected during the averaging period (Daily = 24-hour period; Monthly = calendar month).

(2) Copper and Selenium: These interim limits shall remain in effect until January 1, 2008, or until the Board amends the limits based on site-specific objectives or the Waste Load Allocations in the TMDLs. However, during the next permit reissuance, Board staff may re-evaluate the interim limits.

(3) Mercury: Effluent mercury monitoring shall be performed by using ultraclean sampling and analysis techniques to the maximum extent practicable, with a minimum level of 0.002 µg/l, or lower. The interim limit for mercury shall remain in effect until March 31, 2010, or until the Board amends the limit based on the Waste Load Allocation in the TMDL for mercury. However, during the next permit reissuance, Board staff may re-evaluate the interim limit.

(4) The Discharger shall comply with the interim effluent limitations for lead until March 31, 2010. As described in the findings, there is insufficient effluent data to calculate performance based interim limits at this time. More aggressive monitoring required by this Order will yield sufficient data in about 12 months at which time this permit will be reopened to establish an interim limit for lead.

(5) Nickel: This interim limit shall remain in effect until March 31, 2010, or until the Board amends the limits based on site-specific objectives or the Waste Load Allocations in the TMDLs. However, during the next permit reissuance, Board staff may re-evaluate the interim limit.

(6) Cyanide: Compliance may be demonstrated by measurement of weak acid dissociable cyanide. The interim limit shall remain in effect until May 18, 2003, or until the Board amends the limit

based on additional background data and/or site-specific objectives for cyanide. However, during the next permit revision, Board staff may re-evaluate the interim limit.

(7) As outlined in Section 2.4.5 of the SIP, compliance with these final limits is determined by comparing the effluent data with the corresponding reported Minimum Levels for that analysis. A daily maximum or monthly average value for a given constituent shall be considered non-compliant with the effluent limits only if it exceeds the effluent limitation and the reported ML for that constituent. The table below indicates the highest minimum level that the Discharger's laboratory must achieve for calibration purposes.

Constituent	Minimum Level	Units
Chromium (VI)	10	µg/L
Copper	2	µg/L
Lead	0.5	µg/L
Mercury	0.002	µg/L
Nickel	5	µg/L
Selenium	2	µg/L
Zinc	20	µg/L
Cyanide	5	µg/L
4,4'-DDE	0.05	µg/L
Dieldrin	0.01	µg/L
Benzo(a)Anthracene	5	µg/L
Benzo(a)Pyrene	2	µg/L
Benzo(b)Fluoranthene	10	µg/L
Benzo(k)Fluoranthene	2	µg/L
Chrysene	5	µg/L
Dibenzo(a,h)Anthracene	0.1	µg/L
Indeno(1,2,3-cd)Pyrene	0.05	µg/L
Individual PCBs	0.5	µg/L

(8) The PCB limit applies to the sum of the following individual PCB compounds: PCB-1016, PCB-1221, PCB-1232, PCB-1242, PCB-1248, PCB-1254, and PCB-1260.

(9) TCDD Equivalents: This interim limit shall remain effective until December 30, 2012, or until the Board amends the limits based on site-specific objectives or the Waste Load Allocations in the TMDLs. However, during the next permit reissuance, Board staff may re-evaluate the interim limit.

6. **Interim Mass Emission Limits – Mercury**
Until TMDL and WLA efforts for mercury provide enough information to establish a different WQBEL, the Discharger shall demonstrate that the total mercury mass loading from the discharge at outfall 001 to Suisun Bay has not increased by complying with the following:

a. Interim mass emission limit: The mass emission limit for mercury is 0.014 kilograms per month (kg/month). The total mercury mass load shall not exceed this limit. (If more than one concentration measurement is obtained in a calendar month, the average of these measurements is used as the monthly concentration value for that month. If test results are less than the method detection limit used, the concentration value shall be assumed to be equal to the MDL)

b. Compliance with this limit shall be evaluated using monthly moving averages of total mass load, computed as described below:

12-Month Monthly Moving Average of Total Mass Load = Average of the monthly total mass loads from the past 12 months

Monthly Total Mass Load (kg/month) = monthly plant effluent flows in mgd from Carquinez Strait Outfall 001 x monthly effluent concentration measurements in µg/L corresponding to the above flows, for samples taken at Outfall-001 x 0.1151. (If more than one concentration measurement is obtained in a calendar month, the average of these measurements is used as the monthly concentration value for that month. If test results are less than the method detection limit used, the concentration value shall be assumed to be equal to the method detection limit.)

c. The Discharger shall submit a cumulative total of mass loadings for the previous twelve months with each monthly Self-Monitoring Report. Compliance each month will be determined based on the 12-month moving averages over the previous twelve months of monitoring. The Discharger may use monitoring data collected under accelerated schedules (i.e., special studies) to determine compliance.

d. The mercury TMDL and WLAs will supersede this mass emission limitation upon their completion. The Clean Water Act's antibacksliding rule, Section 402(o), indicates that this Order may be modified to include a less stringent requirement following completion of the TMDL and WLA, if the requirements for an exception to the rule are met.

7. **Interim Mass Emission Limits – Selenium**
Until TMDL and WLA efforts for selenium provide enough information to establish a different WQBEL, the Discharger shall demonstrate that the total selenium mass loading from the discharge at outfall 001 to Suisun Bay has not increased by complying with the following:

a. Interim mass emission limit: The mass emission limit for selenium is 0.96 lb/day (running annual average). Running annual averages shall be calculated by taking the arithmetic average of the current daily mass loading value, and all of the previous year's values. The total selenium mass load shall not exceed this limit.

8. The pH of discharge from Outfall 001 shall not be outside the range of 6.0 to 9.0.

9. The discharge from Outfalls 002, through and including 017 containing constituents in excess or outside of the following limits is prohibited (compliance for outfall 017 shall be determined at the holding tank (tank No. 33) prior to discharge):

Constituent	Units	Limitation
pH	standard units	within 6.5 to 8.5
Oil & Grease	mg/l	daily maximum of 15
TOC	mg/l	daily maximum of 110
Visible oil	-	none observed
Visible color	-	none observed

10. EFFLUENT LIMIT CREDIT FOR RECLAIMED WATER USE: When the Discharger uses reclaimed water, credit for influent concentrations of the constituents listed above, shall be granted in the discharge according to the following procedure provided the Discharger satisfies Provision D.5:

a. The Discharger shall sample and analyze for constituents for which effluent limit credit is sought at least as frequently as is required in the attached Self-Monitoring Program for that constituent. Influent sampling shall occur at influent sampling station I-001 defined in the Self-Monitoring Program.

b. The Discharger shall determine the time interval between introduction of a given constituent of concern in the influent reclaimed water and the first appearance of the constituent in the final effluent. This determination is subject to approval by the Executive Officer, and must precede any calculation of effluent limit credit for the constituent.

c. Credit for constituents listed will be given on a mass and concentration basis.

Concentration Credit

Influent concentration multiplied by total influent reclaimed water flow volume for that monitoring interval will yield an influent mass for each constituent, which is valid for that monitoring interval. After the appropriate time lag interval described in b. above, this influent mass of the constituent is divided by the total effluent flow volume for that monitoring period to give a concentration credit for the effluent that will apply for the monitoring interval. This concentration credit is added to the existing concentration limit. The monitoring interval is the time between sampling days. For example, weekly sampling yields a one week monitoring interval. A schematic example follows:

ex. Constituent B is monitored weekly. The lag time is Y days.

Step 1: (Influent conc. of B in reclaimed water) x (Total Influent Volume of Reclaimed Water for one week) = (Influent mass of B)

Step 2: (Influent mass of B) / (Total E-001 discharge volume for one week, Y days after influent week) = (Concentration credit for constituent B, valid for that one week period)

Step 3: (Concentration credit for constituent B) + (Provision B.5 Effluent limit for constituent B) = Adjusted Effluent Limit for compliance determination, valid for that week.

Mass Credit

Influent concentration multiplied by total influent reclaimed water flow volume for that monitoring interval will yield an influent mass for each constituent, which is valid for that monitoring interval. After the appropriate time lag interval described in b. above, this influent mass of the constituent is then divided by the number of days in that monitoring period to give a mass credit for the effluent that will apply for the monitoring interval. This mass credit is added to the existing mass limit. The monitoring interval is the time between sampling days. For example, weekly sampling yields a one week monitoring interval. A schematic example follows:

ex. Constituent B is monitored weekly. The lag time is Y days.

Step 1: (Influent conc. of reclaimed water B) x (Total Influent Volume of Reclaimed Water for one week) = (Influent mass of B)

Step 2: (Influent mass of B) / (The Number of Days in that monitoring interval) = (Mass credit for constituent B, valid for that one week period)

Step 3: (Mass Credit for constituent B) + (Provision B.6 or B.7 Mass Limit) = Adjusted Effluent Limit for compliance determination, valid for that week.

C. RECEIVING WATER LIMITATIONS

1. The discharges shall not cause the following conditions to exist in waters of the State at any place:

   a. Floating, suspended, or deposited macroscopic particulate matter or foam;

   b. Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses;

   c. Alteration of temperature, turbidity, or apparent color beyond present natural background levels;

   d. Visible, floating, suspended, or deposited oil or other products of petroleum origin; and

   e. Toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on wildlife, waterfowl, or other aquatic biota, or which render any of these unfit for human consumption, either at levels created in the receiving waters or as a result of biological concentration.

2. The discharges shall not cause nuisance, or adversely affect the beneficial uses of the receiving water.

3. The discharges shall not cause the following limits to be exceeded in waters of the State at any one place within one foot of the water surface:

   a. Dissolved Oxygen: 7.0 mg/L, minimum

      The median dissolved oxygen concentration for any three consecutive months shall not be less than 80% of the dissolved oxygen content at saturation. When natural factors cause concentrations less than that specified above, then the discharges shall not cause further reduction in ambient dissolved oxygen concentrations.

   b. Dissolved Sulfide: 0.1 mg/L, maximum

   c. pH: The pH shall not be depressed below 6.5 nor raised above 8.5, nor caused to vary from normal ambient pH by more than 0.5 pH units.

   d. Un-ionized Ammonia: 0.025 mg/L as N, annual median; and
      0.16 mg/L as N, maximum.

   e. Nutrients: Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.

4. The discharges shall not cause a violation of any particular water quality standard for receiving waters adopted by the Board or the State Board as required by the Clean Water Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Board will revise and modify this Order in accordance with such more stringent standards.

D. PROVISIONS

1. **Permit Compliance and Rescission of Previous Waste Discharge Requirements**
The Discharger shall comply with all sections of this Order beginning on January 1, 2003. Requirements prescribed by this Order supersede the requirements prescribed by Order No. 96-068. Order No. 96-068 is hereby rescinded upon the effective date of this permit.

2. **Antidegradation Report**
The Discharger shall comply with the following tasks and schedule:

Task	Deadline
a. Submit an Antidegradation Report acceptable to the Board that evaluates if the increase in flow is consistent with Resolution No. 68-16. The Antidegradation Report shall at a minimum, address mass increases of pollutants discharged, evaluate the capacity of each treatment unit, and propose modifications and a schedule of implementation to ensure that it can adequately treat increased wastewater flows from the planned increase of crude throughput and from the asphalt plant.	Within six months of the effective date of this Order
b. Implement necessary modifications approved by the Board.	In accordance with the schedule approved by the Board. Modifications must be completed no later than 3 months before implementation of throughput increases or asphalt plant addition to ensure sufficient time to resolve treatment unit start up problems.

3. **Increase in Crude Throughput**
The Discharger shall provide written certification substantiated with production records that it has increased its crude throughput from 135,000 to 150,000 barrels per day. A partial increase in production will not qualify for alternative limits allowed by this provision. Upon written acceptance of the certification by the Executive Officer, this Provision shall be considered satisfied.

4. **Treatment of Asphalt Plant Wastewater**
The Discharger shall provide written certification that it has permanently routed asphalt wastewater to its WWTP. Upon written acceptance of the certification by the Executive Officer, this Provision shall be considered satisfied.

5. **Mass and Concentration Credits**

Prior to obtaining mass or concentration credits for using reclaimed water, the Discharger shall submit a technical report that demonstrates such credits will not cause acute toxicity in the vicinity of its discharge. The demonstration shall include, but not be limited to an assessment of the results of whole effluent toxicity and the resultant concentrations of acutely toxic compounds relative to acute criteria. Following written approval of the technical report from the Executive Officer, this provision shall be considered satisfied.

6. **Storm Water Pollution Prevention Plan and Annual Report**
The Discharger shall update and submit an updated Storm Water Pollution Prevention Plan (SWPPP) acceptable to the Executive Officer by October 1st of each year. If Valero determines that it does not need to update its SWPPP, it shall submit a letter to the Executive Officer that indicates no revisions are necessary and the last year it updated its SWPPP. The Discharger shall implement the SWPPP and the SWPPP shall comply with the requirements contained in the attached Standard provisions.

The Discharger shall submit an annual storm water report by July 1 of each year covering data for the previous wet weather season for the identified storm water discharge points. The annual storm water report shall, at a minimum, include: (a) a tabulated summary of all sampling results and a summary of visual observations taken during the inspections; (b) a comprehensive discussion of the compliance record and any corrective actions taken or planned to ensure compliance with waste discharge requirements; and (c) a comprehensive discussion of source identification and control programs for constituents that do not have effluent limitations (e.g., total suspended solids).

7. **Cyanide Study and Schedule - Site-Specific Objective Study for Cyanide**
The Discharger shall ensure the following reports are submitted to the Executive Officer within the specified time periods. The Discharger through a group effort submitted a cyanide study plan on October 29, 2001.

a) Upon approval by the Executive Officer, the Discharger shall implement the cyanide study. Annual reports shall be submitted by January 31 of each year documenting the progress of the ambient background characterization for cyanide, and site-specific objective studies for cyanide. Annual report shall summarize the findings and progress to date, and include a realistic assessment of the shortest practicable time required to perform the remaining tasks of the studies.

b) By June 30, 2003, the Discharger shall submit a report of completion for the site-specific objective study for cyanide. This study shall be adequate to allow the Regional Board to initiate the development and adoption of the site-specific objective for cyanide. This permit may be reopened based on the site-specific objective developed.

8. **Lead Compliance Schedule**
The Discharger shall comply with the following tasks and deadlines:

Task	Deadline
a. Discharger shall submit a report acceptable to the Executive Officer that identifies sources of lead at the refinery based on additional source monitoring, and that proposes a work plan for how those sources will be reduced and controlled in order to achieve compliance with the final limits specified in this Order. Based on this information, the Board will reopen this Permit to establish additional interim requirements within this compliance schedule.	October 1, 2003
b. Additional interim requirements to be determined by the Board	
c. Full compliance with Effluent Limitations B.5. for lead	March 31, 2010

9. **Effluent Characterization for Selected Constituents**
The Discharger shall monitor and evaluate the discharge from outfall 001 for the constituents listed in Enclosure A of the Board's August 6, 2001 Letter. Compliance with this requirement shall be achieved in accordance with the specifications stated in the Board's August 6, 2001 Letter under Effluent Monitoring for major Dischargers. Interim and final reports shall be submitted to the Board in accordance with the schedule specified below (the same schedule is also specified in August 6, 2001 Letter):

Interim and Final Reports: An interim report is due on May 18, 2003. The report shall summarize the data collected to date, and describe future monitoring to take place. A final report that presents all the data shall be submitted to the Board no later than 180 days prior to the permit expiration date. This final report shall be submitted with the application for permit reissuance.

10. **Receiving Water Monitoring**

The Discharger shall collect or participate in collecting background ambient receiving water monitoring for priority pollutants that is required to perform RPAs and calculate effluent limitations. To fulfill this requirement, the Discharger shall submit data sufficient to characterize the concentration of each toxic pollutant listed in the CTR in the ambient receiving water that will provide dilution for the discharge. The data on the conventional water quality parameters (pH, salinity, and hardness) shall also be sufficient to characterize these parameters in the receiving water at a point after the discharge has mixed with the receiving waters.

The BACWA, on behalf of the Discharger and other dischargers, submitted a sampling plan dated September 28, 2001, for a collaborative group monitoring program. The Executive Officer conditionally approved this plan in November 2001.

Interim and Final Reports: The Discharger shall ensure an interim report is submitted by May 18, 2003. The report shall summarize the data collected to date, and describe future monitoring to take place. The Discharger shall ensure that a final report that presents all the data is submitted to the Board 180 days before permit expiration. This final report shall be submitted with the application for permit reissuance.

11. **Pollutant Prevention and Minimization Program (PMP)**
    a. The Discharger shall continue to conduct and improve its existing Pollution Prevention Program in order to reduce pollutant loadings to the treatment plant and therefore to the receiving waters.

    b. The Discharger shall submit an annual report, acceptable to the Executive Officer, no later than February 28th of each year. Annual reports shall cover January through December of the preceding year. Annual reports shall include at least the following information:
        (i) *A brief description of its treatment plant, treatment plant processes and service area.*
        (ii) *A discussion of the current pollutants of concern.* Periodically, the Discharger shall analyze its own situation to determine which pollutants are currently a problem and/or which pollutants may be potential future problems. This discussion shall include the reasons why the pollutants were chosen.
        (iii) *Identification of sources for the pollutants of concern.* This discussion shall include how the Discharger intends to estimate and identify sources of the pollutants.
        (iv) *Identification of tasks to reduce the sources of the pollutants of concern.* This discussion shall identify and prioritize tasks to address the Discharger's pollutants of concern. The Discharger may implement tasks themselves or participate in group, regional, or national

tasks that will address its pollutants of concern. The Discharger is strongly encouraged to participate in group, regional, or national tasks that will address its pollutants of concern whenever it is efficient and appropriate to do so. A time line shall be included for the implementation of each task.

(v) *Outreach to employees.* The Discharger shall inform employees about the pollutants of concerns, potential sources, and how they might be able to help reduce the discharge of pollutants of concern into the treatment plant. The Discharger may provide a forum for employees to provide input to the Program.

(vi) *Discussion of criteria used to measure the Program's and tasks' effectiveness.* The Discharger shall establish criteria to evaluate the effectiveness of its Pollution Prevention Program. This shall also include a discussion of the specific criteria used to measure the effectiveness of each of the tasks in item b. (iv), b. (v), and b. (vi).

(vii) *Documentation of efforts and progress.* This discussion shall detail all of the Discharger's activities in the Pollution Prevention Program during the reporting year.

(viii) *Evaluation of Program's and tasks' effectiveness.* The Discharger shall utilize the criteria established in b. (vii) to evaluate the Program's and tasks' effectiveness.

(ix) *Identification of specific tasks and time schedules for future efforts.* Based on the evaluation, the Discharger shall detail how it intends to continue or change its tasks in order to more effectively reduce the amount of pollutants to the treatment plant, and subsequently in its effluent.

c. According to Section 2.4.5 of the SIP, when there is evidence that a priority pollutant is present in the effluent above an effluent limitation and either:

(i) A sample result is reported as detected, but not quantified (less than the Minimum Level) and the effluent limitation is less than the reported Minimum Level; or

(ii) A sample result is reported as not detected (less than the Method Detection Limit) and the effluent limitation is less than the Method Detection Limit,

the Discharger shall expand its existing Pollution Prevention Program to include the reportable priority pollutant. A priority pollutant becomes a reportable priority pollutant when (1) there is evidence that it is present in the effluent above an effluent limitation and either (c)(i) or (c) (ii) is triggered or (2) if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reported Minimum Level.

d. If triggered by the reasons in Provision D.11.c. and notified by the Executive Officer, the Discharger's Pollution Prevention Program shall, within 6 months, also include:

(i) An annual review and semi-annual monitoring of potential sources of the reportable priority pollutant(s), which may include fish tissue monitoring and other bio-uptake sampling, or alternative measures approved by the Executive Officer when it is demonstrated that source monitoring is unlikely to produce useful analytical data;

(ii) Quarterly monitoring for the reportable priority pollutant(s) in the influent to the wastewater treatment system, or alternative measures approved by the Executive Officer when it is demonstrated that influent monitoring is unlikely to produce useful analytical data;

(iii) Submittal of a control strategy designed to proceed toward the goal of maintaining concentrations of the reportable priority pollutant(s) in the effluent at or below the effluent limitation;

(iv) Development of appropriate cost-effective control measures for the reportable priority pollutant(s), consistent with the control strategy; and

(v) An annual status report that shall be sent to the RWQCB including:

1. All Pollution Prevention monitoring results for the previous year;
2. A list of potential sources of the reportable priority pollutant(s);

3. A summary of all actions undertaken pursuant to the control strategy; and
4. A description of actions to be taken in the following year.

e. To the extent where the requirements of the Pollution Prevention Program and the Pollutant Minimization Program overlap, the Discharger is allowed to continue/modify/expand its existing Pollution Prevention Program to satisfy the Pollutant Minimization Program requirements.

f. These Pollution Prevention/Pollutant Minimization Program requirements are not intended to fulfill the requirements in The Clean Water Enforcement and Pollution Prevention Act of 1999 (Senate Bill 709).

Toxicity Requirements

12. **Whole Effluent Acute Toxicity**
Compliance with acute toxicity requirements of this Order shall be achieved in accordance with the following:

a. From permit adoption date:
(1) Compliance with the acute toxicity effluent limits of this Order shall be evaluated by measuring survival of test organisms exposed to 96-hour flow through bioassays, or static renewal bioassays. If the Discharger will use static renewal tests, or continue to use 3rd Edition Methods, they must submit a technical report by March 1, 2003, identifying the reasons why flow-through bioassay is not feasible using the approved USEPA protocol (4th edition).
(2) Test organisms shall be rainbow trout or fathead minnow unless specified otherwise in writing by the Executive Officer.
(3) All bioassays shall be performed according to the "Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms,"4th Edition, with exceptions granted to the Discharger by the Executive Officer and the Environmental Laboratory Accreditation Program (ELAP).

13. **Compliance with Chronic Toxicity Limitations**
Definitions of terms used in the chronic toxicity effluent limitations are included in Attachment B of this Order. Compliance with chronic toxicity in Effluent Limitation B.4.a of this Order shall be evaluated by measuring the critical life stage toxicity tests for aquatic species as specified in the attached Self-Monitoring Report.

14. **Toxicity Identification Evaluation / Toxicity Reduction Evaluation**
If there is a violation of the chronic toxicity effluent limitation, the Discharger shall conduct a chronic toxicity reduction evaluation (TRE), which shall initially involve a toxicity identification evaluation (TIE). The TIE shall be in accordance with a work plan acceptable to the Executive Officer. The TIE shall be initiated within 30 days of the date of violation. The objective of the TIE shall be to identify the chemical or combination of chemicals that are causing the observed toxicity. Every effort using currently available TIE methodologies shall be employed by the Discharger. If toxic constituents are identified or characterized, the Discharger shall continue the TRE by investigating the source(s) of the toxic constituent(s). Whether toxic constituents can be identified, or not alternative strategies for reducing or eliminating the constituent(s) from the discharge shall be evaluated. All reasonable steps shall be taken to reduce toxicity to the required level. The Board recognizes that identification of causes of chronic toxicity and development of reduction strategies may not be successful in all cases, particularly where toxicity levels fluctuate in the discharge (e.g. violations are intermittent). Consideration of enforcement action resulting from chronic toxicity

effluent limit violations by the Board will be based in part on the Discharger's actions in identifying and reducing sources of consistent toxicity.

15. **Screening Phase Compliance Monitoring**
The Discharger shall conduct screening phase compliance monitoring under either the triggers described in Attachment A of the self-monitoring program. The purpose of the screening is to determine the most sensitive test species for subsequent compliance monitoring for chronic toxicity.

Optional Studies

16. **Optional Mass Offset**
The Discharger may submit to the Board for approval a mass offset plan to reduce 303(d) listed pollutants to the same watershed or drainage basin. The Regional Board may modify this Order to allow an approved mass offset program.

17. **Copper Translator Study and Schedule**
In order to develop information that may be used to establish a WQBEL based on dissolved copper criteria, the Discharger may utilize RMP data from stations nearest the Outfall 001. Copper and nickel translators will be calculated as part of the technical work being conducted for the North of Dumbarton copper/nickel TMDL/SSO project. Optionally, the Discharger may implement a sampling plan to collect data for development of a dissolved to total copper translator. If the Discharger chooses to proceed with the study, which may be conducted in cooperation with other dischargers, the work shall be performed in accordance with the following tasks:

Task

a. Copper Translator Study Plan.
The Discharger shall submit a study plan, acceptable to the Executive Officer, for collection of data that can be used for establishment of a dissolved to total copper translator, as discussed in the Findings.

b. After Executive Officer approval, the Discharger shall begin implementation of the study plan. The study plan shall provide for development of translators in accordance with the SIP, USEPA guidelines, California Department of Fish and Game approval, and any relevant portions of the Basin Plan, as amended.

c. Copper Translator Final Report
The Discharger shall conduct the translator study by using field sampling data approximate to the discharge point and in the vicinity of the discharge point, or as otherwise provided for in the approved workplan, and shall submit a report, acceptable to the Executive Officer, no later than November 30, 2003, documenting the results of the copper translator study. The study may be conducted in coordination with other dischargers and may also include any other site specific information that the Discharger would like the Board to consider in development of a WQBEL for copper.

18. **Contingency Plan Update**
a. The Discharger shall maintain a Contingency Plan as required by Board Resolution 74-10 (attached), and as prudent in accordance with current industrial facility emergency planning. The discharge of pollutants in violation of this Order where the Discharger has failed to develop and/or adequately implement a contingency plan will be the basis for considering such discharge a willful and negligent violation of this Order pursuant to Section 13387 of the California Water Code.

b. The Discharger shall regularly review, and update as necessary, the Contingency Plan in order for the plan to remain useful and relevant to current equipment and operation practices. Reviews shall be conducted annually, and updates shall be completed as necessary.

c. By June 30 of each year the Discharger shall submit to the Board a report describing the current status of its Contingency Plan review and update. This report shall include a description or copy of any completed revisions, or a statement that no changes are needed.

19. **303(d)-listed Pollutants Site-Specific Objective and TMDL Status Review**
Within 30 days of the date of this Order, the Discharger shall provide documentation that it has made appropriate commitments to support and expedite TMDL development for constituents that the Board has granted it a compliance schedule. Following written approval from the Executive Officer, this provision shall be considered satisfied.

The Discharger shall participate in the development of a TMDL or site-specific objective for copper, nickel, mercury, selenium, 4,4'-DDE, dieldrin, dioxin, and PCBs. By January 31 of each year, the Discharger shall submit an update to the Board to document efforts made in participation in the development of TMDLs and/or site-specific objectives. Board staff shall review the status of TMDL development. This Order may be reopened in the future to reflect any changes required by TMDL development.

20. **Self-Monitoring Program**
The Discharger shall comply with the Self-Monitoring Program (SMP) for this Order as adopted by the Board. The SMP may be amended by the Executive Officer pursuant to USEPA regulations 40 CFR 122.62, 122.63, and 124.5.

21. **Standard Provisions and Reporting Requirements**
The Discharger shall comply with all applicable items of the Standard Provisions and Reporting Requirements for NPDES Surface Water Discharge Permits, August 1993 (attached), or any amendments thereafter. Where provisions or reporting requirements specified in this Order are different from equivalent or related provisions or reporting requirements given in 'Standard Provisions', the specifications of this Order shall apply.

22. **Change in Control or Ownership**
a. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Board.
b. To assume responsibility of and operations under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order (see Standard Provisions & Reporting Requirements, August 1993, Section E.4.). Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code.

23. **Permit Reopener**
The Board may modify or reopen this Order and Permit prior to its expiration date in any of the following circumstances:
(1) If present or future investigations demonstrate that the discharge(s) governed by this Order and Permit will or have a reasonable potential to cause or contribute to adverse impacts on water quality and/or beneficial uses of the receiving waters;

(2) New or revised WQOs come into effect for the San Francisco Bay estuary and contiguous water bodies (whether statewide, regional, or site-specific). In such cases, effluent limitations in this permit will be modified as necessary to reflect updated WQOs. Adoption of effluent limitations contained in this Order and Permit is not intended to restrict in any way future modifications based on legally adopted WQOs or as otherwise permitted under Federal regulations governing NPDES permit modifications;

(3) If translator or other water quality studies provide a basis for determining that a permit condition(s) should be modified. The Discharger may request permit modification on this basis. The Discharger shall include in any such request an antidegradation and antibacksliding analysis.

24. **NPDES Permit**

This Order shall serve as a National Pollutant Discharge Elimination System (NPDES) permit pursuant to Section 402 of the Clean Water Act or amendments thereto, and shall become effective on January 1, 2003, provided the USEPA Regional Administrator has no objection. If the Regional Administrator objects to its issuance, the permit shall not become effective until such objection is withdrawn.

25. **Order Expiration and Reapplication**

a. This Order expires on November 30, 2007.
b. In accordance with Title 23, Chapter 3, Subchapter 9 of the California Administrative Code, the Discharger must file a report of waste discharge no later than 180 days before the expiration date of this Order as application for reissue of this permit and waste discharge requirements.

I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on October 16, 2002.

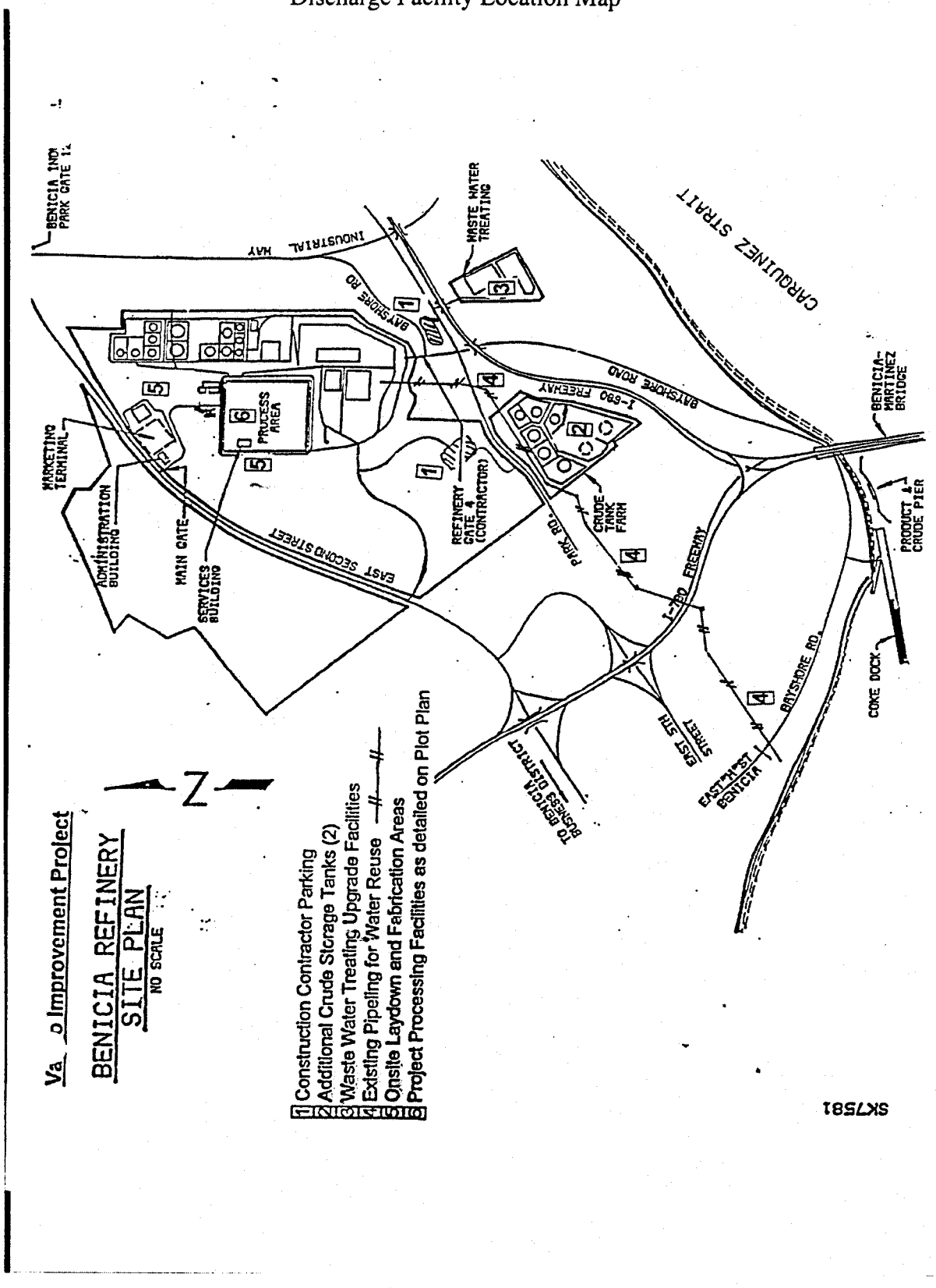
Loretta K. Barsamian

LORETTA K. BARSAMIAN
Executive Officer

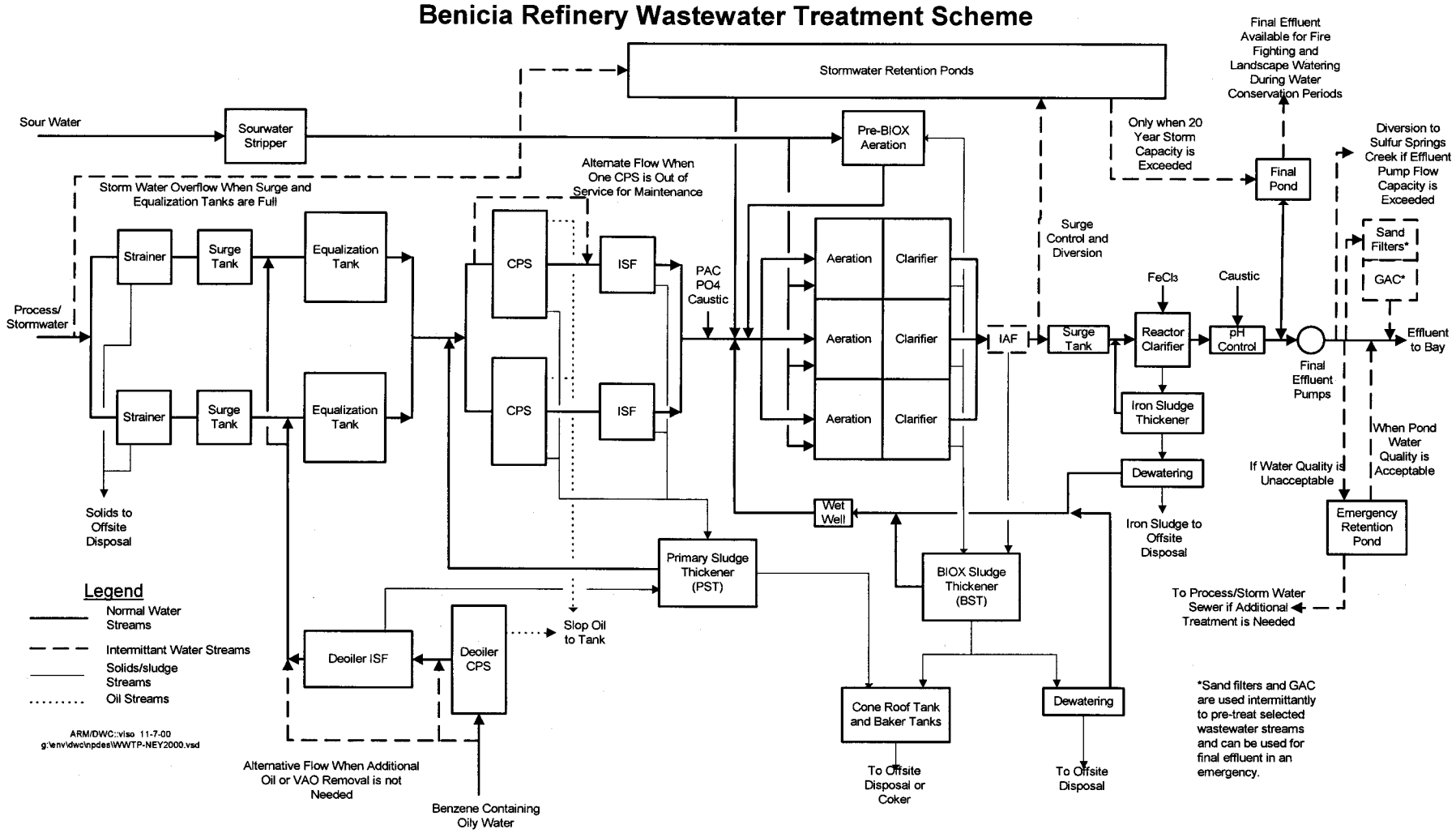
Attachments:

A. Discharge Facility Location Map
B. Discharge Facility Treatment Process Diagram
C. Self-Monitoring Program, Part B
D. Fact Sheet
E. Self-Monitoring Program, Part A
F. Standard Provisions and Reporting Requirements, August 1993
G. Board Resolution No. 74-10
H. Mercury Staff Report

Attachment A
Valero Benicia Refinery
Discharge Facility Location Map



Attachment B
Valero Benicia Refinery
Discharge Facility Treatment Process Diagram



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

VALERO BENICIA REFINERY
BENICIA, SOLANO COUNTY

NPDES PERMIT NO. CA0005550

ORDER NO. 2002-0112

Consists of:
Part A (not attached)
Adopted August 1993

and

Part B (Attached)
Adopted: [October 16, 2002]

Note: Part A (dated August 1993) and Standard Provisions and Reporting Requirements for NPDES Surface Water Discharger Permits (dated August 1993) referenced in this Self Monitoring Program are not attached but are available for review or download on the Board's website at www.swrcb.ca.gov/rwqcb2.

SELF-MONITORING PROGRAM – Part B

I. Description of Sampling and Observation Stations

Station	Description
E-001	At any point in the outfall from the treatment facilities to the discharge point, at which all wastewaters tributary to the outfall are present.
E-002	At any point in the outfall for between the point of discharge and the point at which all storm water tributary to that discharge is present.
E-003	Same as above except discharge is for Outfall 003.
E-004	Same as above except discharge is for Outfall 004.
E-005	Same as above except discharge is for Outfall 005.
E-006	Same as above except discharge is for Outfall 006.
E-007	Same as above except discharge is for Outfall 007.
E-008	Same as above except discharge is for Outfall 008.
E-009	Same as above except discharge is for Outfall 009.
E-010	Same as above except discharge is for Outfall 010.
E-011	Same as above except discharge is for Outfall 011.
E-012	Same as above except discharge is for Outfall 012.
E-013	Same as above except discharge is for Outfall 013.
E-014	Same as above except discharge is for Outfall 014.
E-015	Same as above except discharge is for Outfall 015.
E-016	Same as above except discharge is for Outfall 016.
E-017	Same as above except discharge is for Outfall 017.
I-001	At any point in the pipe which delivers only reclaimed water to the facility, but upstream of any water treatment unit, blending point, or point of use.

II. Schedule of Sampling, Analysis and Observations

The schedule of sampling, analysis and observation shall be that given in Table 1 below.

TABLE 1 A - SCHEDULE of SAMPLING, ANALYSES and OBSERVATIONS [1]

Sampling Station:			E-001	
			Effluent to Suisun Bay	
Type of Sample:			G	C-24
Parameter	Units	**Notes**	[1]	[8]
Flow Rate	MGD	[2]		Cont/D
pH	s.u.			Cont
Temperature	°C			Cont
BOD	mg/L kg/day			M
COD	mg/L kg/day			M

Sampling Station:			E-001	
			Effluent to Suisun Bay	
Type of Sample:			G	C-24
Parameter	Units	**Notes**	[1]	[8]
TSS	mg/L kg/day			W
Oil & Grease	mg/L	[3,4]	W	W
Settleable Matter	ml/l-hr	[4]	M	
Sulfides	mg/L kg/day	[4]	M	
Ammonia N	mg/L kg/day		M	
Acute Toxicity	% Survival	[5]		W
Chronic Toxicity		[6]		Q
Chromium (total)	kg/day			M
Chromium (VI)	µg/L kg/day	[14]	M	
Copper	µg/L kg/day			W
Lead	µg/L kg/day			W
Mercury	µg/L & kg/mo	[7]	M	M
Nickel	µg/L kg/day			W
Selenium	µg/L kg/mo	[9]		W
Zinc	µg/L kg/day			W
Cyanide	µg/L	[10]	W	
Dieldrin	µg/L		2/Y	
4,4'-DDE	µg/L		2/Y	
Benzo(a)Anthracene	µg/L	[11]	M	
Benzo(a)Pyrene	µg/L	[11]	M	
Benzo(b)Fluoranthene	µg/L	[11]	M	
Benzo(k)Fluoranthene	µg/L	[11]	M	
Chrysene	µg/L	[11]	M	
Dibenzo(a,h)Anthracene	µg/L	[11]	M	
Indeno(1,2,3-cd)Pyrene	µg/L	[11]	M	
PCBs	µg/L	[4,12]	2/Y	
2,3,7,8-TCDD and congeners	pg/l	[13]	2/Y	
Aluminum	µg/L	[15]		M
Standard Observations	Daily			

Table 1-B

SCHEDULE of SAMPLING, ANALYSES and OBSERVATIONS [1]

Sampling Station		E-003, 005, 006, 017
Type of Sample		G (except for flow)
Parameter	**Units**	[1]
Flow	MGD	Continuous

Sampling Station		E-003, 005, 006, 017
Type of Sample		G (except for flow)
Parameter	**Units**	[1]
Oil & Grease	mg/l	On each occurrence
TOC	mg/l	On each occurrence
TSS	mg/l	On each occurrence
Specific Conductance	µmhos/cm	On each occurrence
pH	s.u	On each occurrence

Sampling Station		E-002, 004, 007 through E-016[1]
Type of Sample		G (except for flow)
Parameter	**Units**	[1]
Flow	MGD	2/Y
Oil & Grease	mg/l	2/Y
TOC	mg/l	2/Y
TSS	mg/l	2/Y
Specific Conductance	µmhos/cm	2/Y
pH	s.u	2/Y

[1] The Discharger may determine compliance for both outfalls 009 and 010 by monitoring outfall 010.

LEGEND FOR TABLE 1

Types of Samples:

C-24= composite sample, 24 hours (includes continuous sampling, such as for flows)
G= grab sample
O= observation

Frequency of Sampling:
Cont. = continuous
Cont/D = continuous monitoring & daily reporting
M = once each month
W = once each week
Y = once each calendar year
2/Y = Two times a year, one in wet season, one in dry season.
Q = once each calendar quarter (with at least two-month intervals)

Parameter and Unit Abbreviations:
BOD_5 20°C = Biochemical Oxygen Demand, 5-day, at 20°C
$CBOD_5$ 20°C = Carbonaceous BOD, 5-day, at 20 °C
TSS = Total Suspended Solids
MGD = million gallons per day
mg/L = milligrams per liter
ml/L-hr = milliliters per liter, per hour
µg/L= micrograms per liter
pg/L = picograms per liter
kg/day = kilograms per day
kg/mo = kilograms per month
TOC = Total Organic Carbon

FOOTNOTES FOR TABLE 1

[1] Indicates sampling is required during the entire year. The Discharger shall use approved USEPA Methods with the lowest Minimum Levels specified in the SIP and described in footnote 7 of effluent limitations B.5, and in the August 6, 2001, letter.

[2] Flow Monitoring: Effluent flow shall be measured continuously at Outfall 001, and recorded and reported daily. For effluent flows, the following information shall also be reported, monthly:

Daily:	Daily Flow (MG)
Monthly:	Average Daily Flow (MGD)
Monthly:	Maximum Daily Flow (MGD)
Monthly:	Minimum Daily Flow (MGD)
Monthly:	Total Flow Volume (MG)

[3] Oil & Grease Monitoring.
Each Oil & Grease sample event shall consist of a composite sample comprised of three grab samples taken at equal intervals during the sampling date, with each grab sample being collected in a glass container. The grab samples shall be mixed in proportion to the instantaneous flow rates occurring at the time of each grab sample, within an accuracy of plus or minus 5 %. Each glass container used for sample collection or mixing shall be thoroughly rinsed with solvent rinsing as soon as possible after use, and the solvent rinsing shall be added to the composite sample for extraction and analysis.

[4] Grab Samples shall be collected coincident with composite samples collected for the analysis of regulated parameters.

[5] Bioassays: Effluent used for fish bioassays must be dechlorinated prior to testing. Monitoring of the bioassay water shall include, on a daily basis, the following parameters: pH, dissolved oxygen, ammonia nitrogen, and temperature. If a violation of acute toxicity requirements occurs, bioassay testing shall continue back to back until compliance is demonstrated.

[6] Chronic Toxicity:

1. *Chronic Toxicity Monitoring Requirements*
   a. Sampling. The Discharger shall collect 24-hour composite samples of treatment plant effluent at the compliance point station specified in Table 1 of the Self-Monitoring Program, for critical life stage toxicity testing as indicated below. For toxicity tests requiring renewals, 24-hour composite samples collected on consecutive days are required.

   b. Test Species: Chronic toxicity shall be monitored by using critical life stage test(s) and the most sensitive test species identified by screening phase testing or previous testing conducted under the ETCP. The Discharger shall conduct routine monitoring with the species approved by the Executive Officer. At the time of this permit adoption, the approved specie is Mysid Shrimp (*Mysidopsis bahia*).

   c. Conditions for Accelerated Monitoring: The Discharger shall conduct accelerated monitoring when either of the following conditions is exceeded:
      (1) Three sample median value of 10 TUc, or
      (2) Single sample maximum value of 20 TUc.

d. Methodology: Sample collection, handling and preservation shall be in accordance with U.S. USEPA protocols. The test methodology used shall be in accordance with the references cited in this Permit, or as approved by the Executive Officer. A concurrent reference toxicant test shall be performed for each test.

e. Dilution Series: The Discharger shall conduct tests at 2.5%, 5%, 10%, 25%, and 50%. The "%" represents percent effluent as discharged.

2. *Chronic Toxicity Reporting Requirements*

a. Record Keeping: Records for each toxicity test shall include, at a minimum:

(1) sample date(s)
(2) test initiation date
(3) test species
(4) end point values for each dilution (e.g. number of young, growth rate, percent survival)
(5) NOEC value(s) in percent effluent
(6) IC_{15}, IC_{25}, IC_{40}, and IC_{50} values (or EC_{15}, EC_{25} ... etc.) in percent effluent
(7) TUc values (100/NOEC, $100/IC_{25}$, or $100/EC_{25}$)
(8) Mean percent mortality (±s.d.) after 96 hours in 100% effluent (if applicable)
(9) NOEC and LOEC values for reference toxicant test(s)
(10) IC_{50} or EC_{50} value(s) for reference toxicant test(s)
(11) Available water quality measurements for each test (pH, D.O., temperature, conductivity, hardness, salinity, ammonia)

b. Compliance Summary: The results of the chronic toxicity testing shall be provided in the most recent self-monitoring report and shall include a summary table of chronic toxicity data from at least the eleven most recent samples.

[7] The Discharger may, at their option, sample mercury either as grab or 24-hr composite. Use ultra-clean sampling (USEPA 1669) to the maximum extent practicable, and ultra-clean analytical methods (USEPA 1631) for mercury monitoring. The Discharger may use alternative methods of analysis (such as USEPA 245), if that alternate method has a Minimum Level of 2 ng/L or less.

[8] Composite sampling: 24-hour composites may be made up of discrete grabs collected over the course of a day and volumetrically or mathematically flow-weighted. Samples for inorganic pollutants maybe combined prior to analysis. Samples for organic pollutants should be analyzed separately. If only one grab sample will be collected, it should be collected during periods of maximum peak flows. Samples shall be taken on random days.

[9] Selenium must be analyzed for by ICP/MS or the atomic absorption, gaseous hydride procedure (USEPA Method No. 200.8 or Standard Method No. 3114B or 3114C).

[10] The Discharger may, at their option, analyze for cyanide as Weak Acid Dissociable Cyanide using protocols specified in Standard Method Part 4500-CN-I, USEPA Method OI 1677, or equivalent alternatives in latest edition. Alternative methods of analysis must be approved by the Executive Officer.

[11] The latest versions of USEPA Methods 624 (or 8240), and 625 (or 8270) shall be used. The results from USEPA Method 625 shall be used to determine compliance with the effluent limits for PAHs.

[12] The latest versions of USEPA Methods 608 (or 8080) shall be used to determine compliance with the limits for Total PCBs. The Discharger shall attempt to achieve the lowest detection limits commercially available using this method and shall instruct its lab to calibrate to the minimum level indicated in footnote 7 of Effluent Limitation B.5:

[13] Chlorinated Dibenzodioxins and Chlorinated Dibenzofurans shall be analyzed using the latest version of USEPA Method 1613. Alternative methods of analysis must be approved by the Executive Officer.

[14] The Discharger may, at its option, comply with the limits for hexavalent chromium by using total chromium results. In this case, analysis for hexavalent chromium is waived.

[15] The Discharger shall monitor for both total and acid soluble aluminum.

III. Modification of Self-Monitoring Program, Part A (Part A):

A. Modification to section F.4 of Part A: Self-Monitoring Report:

Monthly self-monitoring report: The purpose of the report is to document treatment performance, effluent quality and compliance with waste discharge requirements prescribed by this Order, as demonstrated by the monitoring program data and the Discharger's operation practices. For each calendar month, a self-monitoring report (SMR) shall be submitted to the Board in accordance with the following:

1. The report shall be submitted to the Board no later than 30 days from the last day of the reporting month.

2. *Letter of Transmittal:* Each report shall be submitted with a letter of transmittal. This letter shall include the following:
   a. Identification of all violations of effluent limits or other discharge requirements found during the monitoring period;
   b. Details of the violations: parameters, magnitude, test results, frequency, and dates;
   c. The cause of the violations;
   d. Discussion of corrective actions taken or planned to resolve violations and prevent recurrence, and dates or time schedule of action implementation. If previous reports have been submitted that address corrective actions, reference to such reports is satisfactory;
   e. Signature: The letter of transmittal shall be signed by the Discharger's principal executive officer or ranking elected official, or duly authorized representative, and shall include the following certification statement:

      "I certify under penalty of law that this document and all attachments have been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. The information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

3. *Compliance Evaluation Summary:* Each report shall include a compliance evaluation summary. This summary shall include, for each parameter for which effluent limits are specified in the Permit, the number of samples taken during the monitoring period, and the number of samples in violation of applicable effluent limits.

4. *Results of Analyses and Observations.*
   a. Tabulations of all required analyses and observations, including parameter, sample date and time, sample station, and test result;
   b. If any parameter specified in Table 1 of Part B is monitored more frequently than required by this permit and SMP, the results of this additional monitoring shall be included in the monitoring report, and the data shall be included in data calculations and compliance evaluations for the monitoring period;
   c. Calculations for all effluent limits that require averaging of measurements shall utilize an arithmetic mean, unless specified otherwise in this permit or SMP.

5. *Effluent Data Summary – USEPA NPDES Discharge Monitoring Reports:* Summary tabulations of monitoring data including maximum, minimum and average values for subject monitoring period shall be reported in accordance with the format given by the USEPA NPDES Discharge Report(s) (DMRs; USEPA Form 3320-1 or successor). Copies of these DMRs shall be provided to USEPA as required by USEPA.

6. *Data Reporting for Results Not Yet Available*: The Discharger shall make all reasonable efforts to obtain analytical data for required parameter sampling in timely manner. The Board recognizes that certain analyses require additional time in order to complete analytical processes and result reporting. For cases where required monitoring parameters require additional time to complete analytical processes and reporting, and results are not available in time to be included in the SMR for the subject monitoring period, such cases shall be described in the SMR. Data for these parameters, and relevant discussions of any observed violations, shall be included in the next following SMR after the data become available.

7. *Report Submittal*: The Discharger shall submit SMRs to:
   Executive Officer
   San Francisco Bay Regional Water Quality Control Board
   1515 Clay Street, Suite 1400
   Oakland, CA 94612
   Attn: NPDES Division

B. Modification to section F.5 of Part A: Annual Report:

An Annual Report shall be submitted for each calendar year. The report shall be submitted to the Board by February 28 of the following year. This report shall include the following:

1. A comprehensive discussion of treatment plant performance and compliance with waste discharge requirements. This discussion should include any corrective actions taken or planned such as changes to facility equipment or operation practices which may be needed to achieve compliance, and any other actions taken or planned that are intended to improve performance and reliability of the Discharger's wastewater collection, treatment or disposal practices.

C. Additions to Part A of Self-Modification Program:

1. Reporting Data in Electronic Format:

The Discharger has the option to submit all monitoring results in electronic reporting format approved by the Executive Officer. If the Discharger chooses to submit the SMRs electronically, the following shall apply:

a. *Reporting Method*: The Discharger shall submit SMRs electronically via the process approved by the Executive Officer in a letter dated December 17, 1999, Official Implementation of Electronic Reporting System (ERS).
b. *Modification of reporting requirements:* Reporting requirements F.4 in the attached *Self-Monitoring program, Part A*, dated August 1993, shall be modified as follows. In the future, the Board intends to modify Part A to reflect these changes.
c. Monthly Report Requirements: For each calendar month, a self-monitoring report (SMR) shall be submitted to the Board in accordance with the following:
   i. The report shall be submitted to the Board no later than 30 days from the last day of the reporting month.
   ii. Letter *of Transmittal:* Each report shall be submitted with a letter of transmittal. This letter shall include the following:
      (i) Identification of all violations of effluent limits or other discharge requirements found during the monitoring period;
      (ii) Details of the violations: parameters, magnitude, test results, frequency, and dates;
      (iii) The cause of the violations;
      (iv) Discussion of corrective actions taken or planned to resolve violations and prevent recurrence, and dates or time schedule of action implementation. If previous reports have been submitted that address corrective actions, reference to such reports is satisfactory.
      (v) Signature: The letter of transmittal shall be signed by the Discharger's principal executive officer or ranking elected official, or duly authorized representative, and shall include the following certification statement:
      "I certify under penalty of law that this document and all attachments have been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. The information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."
      (vi) Compliance Evaluation Summary: Each report shall include a compliance evaluation summary. This summary shall include the number of samples in violation of applicable effluent limits.
      (vii) Results of Analyses and Observations.
      (viii) Tabulations of all required analyses and observations, including parameter, sample date, sample station, and test result.
      (ix) If any parameter is monitored more frequently than required by this permit and SMP, the results of this additional monitoring shall be included in the monitoring report, and the data shall be included in data calculations and compliance evaluations for the monitoring period.
      (x) Calculations for all effluent limits that require averaging of measurements shall utilize an arithmetic mean, unless specified otherwise in this permit or SMP.

d. Data Reporting for Results Not Yet Available: The Discharger shall make all reasonable efforts to obtain analytical data for required parameter sampling in a timely manner. The Board recognizes that certain analyses require additional time in order to complete analytical processes and result reporting. For cases where required monitoring parameters require additional time to complete analytical processes and reporting, and results are not available in time to be included in the SMR for the subjected monitoring period, such cases shall be described in the SMR. Data for these parameters, and relevant discussions of any observed violations, shall be included in the next following SMR after the data become available.

IV. MISCELLANEOUS REPORTING

A. The Discharger shall record the rainfall on each day of the month and submit the data with each report.

B. If the Discharger seeks credit for storm water runoff/ballast water allocation (daily & monthly) for its discharge, it must use the method described in the attached Form A. To receive such credits, Form A must be submitted with the monthly self-monitoring report and the daily maximum allocation for each day Outfall 001 is monitored must be computed.

C. The Discharger shall retain and submit (when required by the Executive Officer) the following information concerning the monitoring program for organic and metallic pollutants.

a. Description of sample stations, times, and procedures.

b. Description of sample containers, storage, and holding time prior to analysis.

c. Quality assurance procedures together with any test results for replicate samples, sample blanks, and any quality assurance tests, and the recovery percentages for the internal surrogate standard.

Ballast water treated and discharged as part of Outfall 001 shall be metered and the volume recorded in attached Form A for each calendar day. The 30-day average shall be the sum of the daily values in a calendar month divided by the number of days in that month. Ballast-water allocations shall be calculated by multiplying the volume of ballast water, determined above by the appropriate volume of ballast water, determined above by the appropriate concentration listed under Effluent Limitation B.2. in the permit.

V. Self-Monitoring Program Certification

I, Loretta K. Barsamian, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in Board Order No. 2002-0112.

2. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the Discharger, and revisions will be ordered by the Executive Officer.

3. Is effective as of January 1, 2003.

LORETTA K. BARSAMIAN
Executive Officer

Attachment A: Chronic Toxicity – Definition of Terms and Screening Phase Requirements
Attachment B: Form A: Stormwater/Ballast Water Allocation Procedures

ATTACHMENT A

CHRONIC TOXICITY

DEFINITION OF TERMS & SCREENING PHASE REQUIREMENTS

I. Definition of Terms

A. No observed effect level (NOEL) for compliance determination is equal to IC_{25} or EC_{25}. If the IC_{25} or EC_{25} cannot be statistically determined, the NOEL shall be equal to the NOEC derived using hypothesis testing.

B. Effective concentration (EC) is a point estimate of the toxicant concentration that would cause an adverse effect on a quantal, "all or nothing," response (such as death, immobilization, or serious incapacitation) in a given percent of the test organisms. If the effect is death or immobility, the term lethal concentration (LC) may be used. EC values may be calculated using point estimation techniques such as probit, logit, and Spearman-Karber. EC_{25} is the concentration of toxicant (in percent effluent) that causes a response in 25% of the test organisms.

C. Inhibition Concentration (IC) is a point estimate of the toxicant concentration that would cause a given percent reduction in a non-lethal, non-quantal biological measurement, such as growth. For example, an IC_{25} is the estimated concentration of toxicant that would cause a 25% reduction in average young per female or growth. IC values may be calculated using a linear interpolation method such as USEPA's Bootstrap Procedure.

D. No observed effect concentration (NOEC) is the highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specific time of observation. It is determined using hypothesis testing.

II. Chronic Toxicity Screening Phase Requirements

A. The Discharger shall perform screening phase monitoring:

1. Subsequent to any significant change in the nature of the effluent discharged through changes in sources or treatment, except those changes resulting from reductions in pollutant concentrations attributable to source control efforts, or

2. Prior to Permit reissuance. Screening phase monitoring data shall be included in the NPDES Permit application for reissuance. The information shall be as recent as possible, but may be based on screening phase monitoring conducted within 5 years before the permit expiration date.

B. Design of the screening phase shall, at a minimum, consist of the following elements:

1. Use of test species specified in Tables 1 and 2 (attached), and use of the protocols referenced in those tables, or as approved by the Executive Officer;

2. Two stages:

   a. Stage 1 shall consist of a minimum of one battery of tests conducted concurrently. Selection of the type of test species and minimum number of tests shall be based on Table 3 (attached); and

b. Stage 2 shall consist of a minimum of two test batteries conducted at a monthly frequency using the three most sensitive species based on the Stage 1 test results and as approved by the Executive Officer.

3. Appropriate controls; and

4. Concurrent reference toxicant tests.

C. The Discharger shall submit a screening phase proposal to the Executive Officer for approval. The proposal shall address each of the elements listed above.

TABLE C 1
CRITICAL LIFE STAGE TOXICITY TESTS FOR ESTUARINE WATERS

SPECIES	(Scientific name)	EFFECT	TEST DURATION	REFER-ENCE
alga	(Skeletonema costatum) (Thalassiosira pseudonana)	growth rate	4 days	1
red alga	(Champia parvula)	number of cystocarps	7-9 days	3
Giant kelp	(Macrocystis pyrifera)	percent germination; germ tube length	48 hours	2
abalone	(Haliotis rufescens)	abnormal shell development	48 hours	2
oyster mussel	(Crassostrea gigas) (Mytilus edulis)	{abnormal shell development; {percent survival	48 hours	2
Echinoderms (urchins - (sand dollar - Dendraster excentricus)	Strongylocentrotus purpuratus, S. franciscanus);	percent fertilization	1 hour	2
shrimp	(Mysidopsis bahia)	percent survival; growth	7 days	3
shrimp	(holmesimysis costata)	percent survival; growth	7 days	2
topsmelt	(Atherinops affinis)	percent survival; growth	7 days	2
silversides	(Menidia beryllina)	larval growth rate; percent survival	7 days	3

Toxicity Test References:

1. American Society for Testing Materials (ASTM). 1990. Standard Guide for conducting static 96-hour toxicity tests with microalgae. Procedure E 1218-90. ASTM Philadelphia, PA.

2. Short-term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to West Coast Marine and Estuarine Organisms. USEPA/600/R-95/136. August 1995

3. Short-term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Marine and Estuarine Organisms as specified in 40CFR 136. Currently, this is USEPA/600/4-90/003, July 1994. Later editions may replace this version.

TABLE C 2
CRITICAL LIFE STAGE TOXICITY TESTS FOR FRESH WATERS

SPECIES	(Scientific name)	EFFECT	TEST DURATION	REFERENCE
fathead minnow	(Pimephales promelas)	survival; growth rate	7 days	4
water flea	(Ceriodaphnia dubia)	survival; number of young	7 days	4
alga	(Selenastrum capricornutum)	cell division rate	4 days	4

Toxicity Test Reference:

4. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms as specified in 40CFR 136. Currently, this is the third edition, USEPA/600/4-91/002, July 1994. Later editions may replace this version.

TABLE C 3

TOXICITY TEST REQUIREMENTS FOR STAGE ONE SCREENING PHASE

REQUIREMENTS	RECEIVING WATER CHARACTERISTICS		
	Discharges to Coast	Discharges to San Francisco Bay ‡	
	Ocean	Marine/Estuarine	Freshwater
Taxonomic Diversity:	1 plant 1 invertebrate 1 fish	1 plant 1 invertebrate 1 fish	1 plant 1 invertebrate 1 fish
Number of tests of each salinity type: Freshwater (†): Marine/Estuarine:	0 4	1 or 2 3 or 4	3 0
Total number of tests:	4	5	3

† The fresh water species may be substituted with marine species if:
1) The salinity of the effluent is above 1 parts per thousand (ppt) greater than 95% of the time, or
2) The ionic strength (TDS or conductivity) of the effluent at the test concentration used to determine compliance is documented to be toxic to the test species.

‡ Marine/Estuarine refers to receiving water salinities greater than 1 ppt at least 95% of the time during a normal water year.
Fresh refers to receiving water with salinities less than 1 ppt at least 95% of the time during a normal water year.

Attachment B of Self-Monitoring Program: FORM A

STORMWATER / BALLAST WATER ALLOCATION PROCEDURE

This procedure uses a bankbook to inventory stormwater. Any stormwater in excess of the estimated processed stormwater is inventoried. Stormwater allocations are calculated using the acutaul processed stormwater developed in the attached table.

Definitions:

Dry Weather Season - The months of June to September exclusive of a one-week period following any rainstorm.

Estimated Dry Weather Process Wastewater Flow - The average effluent flowrate during the previous dry weather season.

Stormwater Runoff - The product of the inches of rainfall and the runoff factor.

Estimated Processed Stormwater - The difference between the actual effluent flow rate and the ballast water plus dry weather flow rate.

Stormwater Bankbook - Calculated inventoried stormwater.

Actual Process Stormwater - If the stormwater bankbook is not zero, the acutal process stormwater equals the estimated flow. If the bankbook is zero, the actual processed stormwater is equal to the stormwater runoff for that day plus the bankbook for the previous day.

Attachment B of Self-Monitoring Program: Form A (Cont'd)

TABLE FOR RECORDS OF RAINFALL, STORMWATER RUNOFF, AND BALLAST FLOW

Date	Rainfall (inches)	Storm Runoff Flow (rainfall x runoff factor) Gallons	Ballast Flow in Gallons
1-2			
2-3			
3-4			
4-5			
5-6			
6-7			
7-8			
8-9			
9-10			
10-11			
11-12			
12-13			
13-14			
14-15			
15-16			
16-17			
17-18			
18-19			
19-20			
20-21			
21-22			
22-23			
23-24			
24-25			
25-26			
26-27			
27-28			
28-29			
29-30			
30-31			
31-1			
Total			
Monthly Average			

Attachment B of Self-Monitoring Program: Form A (Cont'd)

STORMWATER/BALLAST WATER ALLOCATION PROCEDURE

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
	Rainfall (inch)	Stormwater Runoff (MGD)	Effluent Flow (MGD)	Dry Weather Effluent Flow (MGD)	Estimated Processed Stormwater (MGD)	Stormwater Bankbook (MGD)	Actual Processed Stromwater (MGD)	Ballast Water (MGD)
				Previous Month's Bankbook =				
1								
2								
3								
.								
.								
.								
.								
30								
Total								
Average								
Maximum								

Column (B) = Column (A) X Runoff Factor.
Column (D) = Dry Weather Effluent Flow + Documented Process Water Increment.
Column (E) = Column (C) - Column (D) - Column (H).
Column (F):

Column (F) = Column (F) $_{\text{previous day}}$ + Column (B) - Column (E);
Column (F) = 0, if Column (F) <0.

Column (G):

Column (G) = Column (E), if Column (F) >0;
Column (G) = Column (B) + Column (F) $_{\text{previous day}}$, if Column (F) =0.

Attachment B of Self-Monitoring Program: Form A (Cont'd)

CALCULATION OF STORMWATER AND BALLAST WATER ALLOCATIONS

		Monthly Average Storm Runoff + Ballast Water Flow (expressed in 1000 gallons/day)	x	Allocation Factor (kg /1000 gallons)	=	(kg /day)	+	A.1 Effluent Limits (kg /day)	=	Total Effluent Limit (kg /day)	Year:
30-Day Average Limitation (kg /day)	BOD_5		x	0.098	=		+		=		
	TSS		x	0.079	=		+		=		
	TOC		x	0.22	=		+		=		
	COD		x	0.68	=		+		=		
	O&G		x	0.03	=		+		=		
	Phenol		x	0.00064	=		+		=		
	Total Chrome		x	0.00079	=		+		=		
	Hex Chrome		x	0.00011	=		+		=		

Attachment B of Self-Monitoring Program: Form A (Cont'd)

REPORT FORMAT FOR ADJUSTED EFFLUENT LIMITATIONS

	MAXIMUM DAILY LIMITS						
DATE	BOD (kg/day)	TSS (kg/day)	COD (kg/day)	O&G (kg/day)	PHENOL (kg/day)	TOTAL CHROME (kg/day)	HEX CHROME (kg/day)

Maximum Daily Limit (kg/day) = Effluent Limit B.5 (Daily Max in kg/day) + Stormwater Allocation (Daily Max in kg/day)

Stormwater Allocation (kg/day) = Effluent Limit B.6 (Daily Max in mg/l) x Daily Processed Stormwater (in MGD) x 3.785 liters/gal

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
1515 CLAY STREET, SUITE 1400
OAKLAND, CA 94612
(510) 622 – 2300 Fax: (510) 622 - 2460

FACT SHEET

for

NPDES PERMIT and WASTE DISCHARGE REQUIREMENTS for

VALERO BENICIA REFINERY

BENICIA, SOLANO COUNTY

NPDES Permit No. CA0005550

ORDER NO. R2-2002-0112

PUBLIC NOTICE:

Written Comments

- Interested persons are invited to submit written comments concerning this draft permit.
- Comments must be submitted to the Regional Board no later than 5:00 p.m. on September 3, 2002.
- Send comments to the Attention of Robert Schlipf.

Public Hearing

- The draft permit will be considered for adoption by the Board at a public hearing during the Board's regular monthly meeting at: Elihu Harris State Office Building, 1515 Clay Street, Oakland, CA; 1st floor Auditorium.
- This meeting will be held on: October 16, 2002, starting at 9:00 am.

Additional Information

- For additional information about this matter, interested persons should contact Regional Board staff member: Mr. Robert Schlipf, Phone: (510) 622-2478; email: rs@rb2.swrcb.ca.gov

This Fact Sheet contains information regarding an application for waste discharge requirements and National Pollutant Discharge Elimination System (NPDES) permit for the Valero Benicia Refinery (Valero) for industrial wastewater and storm water discharges. The Fact Sheet describes the factual, legal, and methodological basis for the proposed permit and provides supporting documentation to explain the rationale and assumptions used in deriving the limits.

I. INTRODUCTION

The Valero Benicia Refinery (hereinafter called the Discharger) has applied to the Board for reissuance of waste discharge requirements and a permit to discharge industrial wastewater and storm water to waters of the State and the United States under the National Pollutant Discharge Elimination System (NPDES). The application and Report of Waste Discharge is dated November 13, 2000, and was supplemented on March 20, 2002 and amended on July 11, 2002.

The Discharger owns and operates a petroleum refinery with an average crude-run throughput of approximately 135,000 barrels per day. The Discharger has proposed to increase crude-run throughput to 165,000 barrels per day. The Discharger manufactures hydrocarbon products, byproducts and intermediates, and is classified as a cracking refinery as defined by the U.S.

Environmental Protection Agency (USEPA) in 40 CFR 419.20. The USEPA and the Board have classified Valero as a major discharger.

The receiving waters for the subject discharges are the waters of Carquinez Strait and Suisun Bay. Beneficial uses for the Carquinez Strait and Suisun Bay receiving waters, as identified in the Basin Plan and based on known uses of the receiving waters in the vicinity of the discharges, are:

a. Industrial Service Supply
b. Navigation
c. Water Contact Recreation
d. Non-contact Water Recreation
e. Commercial and Sport Fishing
f. Wildlife Habitat
g. Preservation of Rare and Endangered Species
h. Fish Migration
i. Fish Spawning
j. Estuarine Habitat

Effluent limitations included in the previous Order were derived from marine criteria. The receiving waters for the subject discharge are the waters of Carquinez Strait and Suisun Bay, which are tidally influenced water bodies, with significant fresh water inflows during the wet weather season. Furthermore, based on Regional Monitoring Program data, Carquinez Strait and Suisun Bay meet the definition of estuarine under the definitions included in the California Toxics Rule (CTR) and the Basin Plan. Therefore, the effluent limitations specified in this Order for discharges to Carquinez Strait and Suisun Bay are based on the lower of the marine and freshwater Basin Plan WQOs and CTR and NTR WQC.

II. DESCRIPTION OF EFFLUENT

Board Order No. 96-068, (hereinafter the Previous Order), presently regulates the discharges. The discharges are described below and are based on information contained in the Report of Waste Discharge and recent self-monitoring reports. Note that not all of the storm water outfalls (002-017) represent final outfalls to receiving waters but rather some are internal locations within the facility's drainage system where runoff from discrete areas of the plant is contained.

a. **Outfall 001** consists of an average of 2.34 million gallons per day (MGD) of treated process wastewaters including stripped sour water, cooling tower and boiler blowdown, crude water draw from onsite and offsite storage facilities, raw water treatment backwash, ballast water, storm water runoff from process areas, extracted groundwater from on-site remediation activities, and monitoring well purge water from off-site service stations owned by the Discharger. Process wastewater from the asphalt plant recently acquired by the Discharger is currently discharged to a POTW. The Discharger may reroute asphalt wastewater to the on-site wastewater treatment facility and Outfall 001 in the future.

   Oily wastewater streams are first treated in corrugated plate separators (CPS), and induced static flotation (ISF) units to remove oils and solids. Most of the non-oily waste stream from the sour water stripper (stripped sour water) is initially aerobically treated in two prebiox activated sludge units. A smaller portion of the stripped sour water is then combined with the oily wastewater streams and the prebiox effluents and is treated in three parallel activated sludge biological treatment units to which powder activated carbon is added. Treatment continues with three clarifiers in parallel. Effluent from the clarifiers is discharged to an induced air flotation (IAF)

unit, which provides additional solids removal. From the IAF unit, wastewater flows to a reactor clarifier where ferric chloride is added to co-precipitate selenite. Polymer is also added to enhance flocculation. Caustic is then added for pH control and wastewater flows to a sump. From the sump, effluent is pumped to Outfall 001. The Discharger has indicated that it will on occasion use its crude field retention pond to store treated wastewater when preliminary data indicates that it might violate effluent limits. After subsequent testing, the Discharger may return effluent from the crude field retention pond to its WWTP for full or partial treatment. If testing shows that all effluent limits are met, the Discharger may return effluent from the crude field retention pond to the final pond sump without additional treatment.

Outfall 001 discharges to Suisun Bay (lat. 38°03'18", long. 122°07'07") at a depth of 18 feet about 1,100 feet offshore, west of the Suisun Reserve Fleet Anchorage, through a 12-inch diameter outfall with 3 diffusion ports. To comply with Discharge Prohibition A.1 of the previous Order, the Discharger's diffuser must provide a minimum initial dilution of 10:1. The quality of the discharge based on 1999-2001 monitoring data is presented in the following table. The table reflects detected constituents and values only. No organic constituents were detected in the effluent during 1999-2001.

Table A. Summary of Effluent Data for Outfall E001

Parameter	Average	Daily Maximum
pH, standard units	--	8.8
BOD_5, mg/L	1.8	8.2
BOD_5, lbs/d	28.8	126.5
COD, mg/L	66.4	260
COD, lbs/d	1044.2	3556.2
TSS, mg/L	5.9	23
TSS, lbs/d	99.03	402.8
Ammonia as N, mg/L	0.21	1.8
Ammonia as N, lbs/d	3.13	22.22
Oil and Grease, mg/L	1.7	5.8
Total Phenols, µg/L	9.1	22
Total Phenols, lbs/d	0.15	0.44
Aluminum, µg/L	382.3	1500
Cr (VI), µg/L	15.25	18
Cr (VI), lbs/d	0.22	0.26
Cobalt, µg/L	1.41	1.43
Copper, µg/L	15.2	35.2
Cyanide, µg/L	19.6	50
Lead, µg/L	4.5	8
Mercury, µg/L	0.016	0.053
Nickel, µg/L	18.2	76.1
Selenium, µg/L	23.5	44
Total Chromium, µg/L	15	26
Total Chromium, lbs/d	0.27	0.44
Vanadium, µg/L	23.3	98
Zinc, µg/L	40.2	102

This Order continues to allow the Discharger's reuse of treated effluent for on-site landscape irrigation, and in the refinery firewater system as a water conservation measure. This reuse is approved provided no irrigation water runoff from the facility occurs, and all water in the firewater system is captured and retreated in the Discharger's wastewater treatment plant.

b. **Outfall 002** consists of storm water runoff from an unpaved area of approximately 1.8 acres, located along the western boundary of the Discharger's wastewater treatment plant. The area is occasionally used to store equipment and is separated from the plant by a dike. The discharge is through a ditch and several pipes into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°03'53", long. 122°07'37"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	18.4	36.5
TSS, mg/L	78.5	158
Oil and Grease, mg/L	1.5	7.7

c. **Outfall 003** consists of storm water runoff from a 19 acre unpaved area. The discharge is near the Raw Water Break Tank at the north end of Avenue 'A' via a culvert to Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°04'49", long. 122°08'12"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	14.8	75.4
TSS, mg/L	74.4	599
Oil and Grease, mg/L	0.2	2.7

d. **Outfall 004** consists of storm water runoff from a 0.51-acre gravel area between First Street and the railway, on the south side of First Street. The runoff is discharged west of Gate No. 4 into the eastern end of a ditch (Beaver Creek), followed by a culvert, another ditch (Buffalo Wallow), and a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°03'59", long. 122°07'58"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	5.3	15.6
TSS, mg/L	83.8	308
Oil and Grease, mg/L	0.2	1.1

e. **Outfall 005** consists of storm water runoff from a 69-acre area that is primarily unpaved (1 percent paved surface). This area is located west of the processing area. The area is primarily open space, and consists of roads, parking and administration buildings for contractors, and a laydown area for miscellaneous equipment. The runoff is discharged west of Gate No. 4, on the south side of the processing area via a spillway into the western end of a ditch (Beaver Creek), followed by a culvert, another ditch (Buffalo Wallow), and a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°03'58", long. 122°08'05"). A natural spring also discharges to this drainage. The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	12.8	44.3
TSS, mg/L	69.3	256.5
Oil and Grease, mg/L	0.1	1.4

f. **Outfall 006** consists of condensate from steam traps, groundwater seepage and storm water runoff from a 3.5-acre unpaved area along and under the crude pipeline, starting at the southwest corner of the crude tank field and running northeast along the perimeter of the tank field and

Park Road. It includes runoff from the adjacent city road. The runoff collects in a concrete sump equipped with a containment valve and a hydrocarbon detector, which alarms at a central control house and automatically closes the containment valve in the event of a leak. Outfall006 discharges to a ditch, which flows into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°03'50", long. 122°07'57"). A natural spring also discharges to this drainage. The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	12.2	36.8
TSS, mg/L	165.2	685
Oil and Grease, mg/L	0.1	1.6

g. **Outfall 007** consists of storm water runoff from a 0.69-acre gravel and paved area. This area forms part of the access road to the refinery and is used for temporary parking of vehicles accessing the facility. The runoff discharges just east of Gate 4 via a tributary ditch (Buffalo Wallow) followed by a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°04'02", long. 122°07'54"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	42.4	70.2
TSS, mg/L	469.4	1434
Oil and Grease, mg/L	2.4	3.8

h. **Outfall 008** consists of storm water runoff from a 0.92-acre graveled railway area. This area is located east of the processing area. The runoff is discharged east of Gate No. 4 via a Culvert, into a ditch (Buffalo Wallow), followed by a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°04'02", long. 122°07'53"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	9	17.4
TSS, mg/L	152.7	345
Oil and Grease (mg/L)	0.0	0.0

i. **Outfall 009** consists of storm water runoff from a 0.25-acre 50% gravel and 50% paved area, located between the railway and Avenue 'A'. The runoff is discharged along Avenue 'A' on the southeast side of the processing area via a culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°04'12", long. 122°07'53"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	23.7	31.6
TSS, mg/L	152	425
Oil and Grease, mg/L	0.9	1.3

j. **Outfall 010** consists of storm water runoff from a 0.84-acre gravel and paved area that is 30% paved. This area is located between the railway and Avenue 'A'. The runoff is discharged along Avenue 'A' on the southeast side of the processing area via a culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°04'12", long. 122°07'53"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	10.5	19
TSS, mg/L	141	407
Oil and Grease, mg/L	0.4	1.2

Since Outfalls 009 and 010 receive storm water runoff from the same area, it is appropriate to combine them for compliance purposes. The combined area of outfalls 009 and 010 is 1.09 acres of which 35% is paved, 12% is gravel, and 53% is unpaved.

k. **Outfall 011** consists of storm water runoff from a 0.38-acre unpaved area under and along the crude pipeline on the north side of Park Road. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff is discharged on the north side of Park Road, where the refinery crude pipeline crosses Park road, via a culvert that discharges into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°03'52", long. 122°07'57"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	8.8	16.7
TSS, mg/L	283	859
Oil and Grease (mg/L)	0.0	0.0

l. **Outfall 012** consists of storm water runoff from a 0.78-acre primarily gravel area (10% paved) under a section of the crude pipeline southwest of the crude tank field. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff discharges into the city of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°03'15", long. 122°08'19"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	13	28.2
TSS, mg/L	21	60
Oil and Grease, mg/L	0.3	1.6

m. **Outfall 013** consists of storm water runoff from a 1.2-acre (5 % paved) area under the crude pipeline southwest of Outfall 012. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff discharges into the City of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°03'08", long. 122°08'25"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	14.8	30.5
TSS, mg/L	153	598
Oil and Grease, mg/L	0.5	1.9

n. **Outfall 014** consists of storm water runoff from a 0.35-acre unpaved area under the crude pipeline south of Outfall 013. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff discharges into the city of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°03'03", long. 122°08'23"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	12.9	24.7
TSS, mg/L	205	601
Oil and Grease, mg/L	0.4	1.6

o. **Outfall 015** consists of storm water runoff from a 0.50-acre unpaved area under the crude pipeline southeast of Outfall 014. Runoff collects in a concrete sump equipped with an automatic valve, and hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff is discharges into the city of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°02'50", long. 122°07'55"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	11.2	30.5
TSS, mg/L	19	79
Oil and Grease mg/L	0.0	0.0

p. **Outfall 016** consists of storm water runoff from a 0.07-acre unpaved area under the crude pipeline south of Outfall 015, near the refinery dock. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector, which alarms at a central control house in the event of a hydrocarbon release from the crude pipeline. The runoff discharges via a culvert into the Carquinez Strait (lat. 38°02'44", long. 122°07'45"). The quality of this discharge based on data presented in the Report of Waste Discharge is as follows:

Parameter	Average	Maximum
TOC, mg/L	14.8	36.7
TSS, mg/L	28	66
Oil and Grease, mg/L	0.3	2.1

q. **Outfall 017** consists of nonprocess storm water runoff from about 12 acres at the asphalt plant of which roughly 35 percent is impervious. Runoff collects in a 0.425 million gallon holding tank (tank No. 33), located north of Buffalo Wallow. From the holding tank, storm water is discharged on batch basis via an underground culvert to Buffalo Wallow, then to a 72-inch culvert into Sulfur Springs Creek, and ultimately to Suisun Bay (lat. 38°03'58", long. 122°08'05"). Based on self-monitoring data from 2001 and 2002 the quality of this discharge is as follows:

Parameter	Average	Maximum
TDS (mg/L)	150	210
Oil and Grease (mg/L)	3.9	9.2

III. GENERAL RATIONALE

The following documents are the bases for the requirements contained in the proposed Order, and are referred to under the specific rationale section of this Fact Sheet.

- Federal Water Pollution Control Act, as amended (hereinafter the **CWA**).
- Federal Code of Regulations, Title 40 - Protection of Environment, Chapter 1, Environmental Protection Agency, Subchapter D, Water Programs, Parts 122-129 (hereinafter referred to as 40 CFR specific part number).
- Water Quality Control Plan, San Francisco Bay Basin, adopted by the Board on June 21, 1995 (hereinafter the **Basin Plan**). The California State Water Resources Control Board (hereinafter the **State Board**) approved the Basin Plan on July 20, 1995 and by California State Office of Administrative Law approved it on November 13, 1995. The Basin Plan defines beneficial uses and contains WQOs for waters of the State, including Suisun Bay.
- California Toxics Rules, Federal Register, Vol. 65, No. 97, May 18, 2000 (hereinafter the **CTR**).
- National Toxics Rules 57 FR 60848, December 22, 1992, as amended (hereinafter the **NTR**).
- State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, May 1, 2000 (hereinafter the **State Implementation Policy**, or **SIP**).
- Quality Criteria for Water, USEPA 440/5-86-001, 1986.
- Ambient Water Quality Criteria for Bacteria – 1986, USEPA440/5-84-002, January 1986.

IV. SPECIFIC RATIONALE

Several specific factors affecting the development of limitations and requirements in the proposed Order are discussed as follows:

1. Recent Plant Performance

Section 402(o) of CWA and 40 CFR § 122.44(l) require that water quality-based effluent limits (**WQBELs**) in re-issued permits be at least as stringent as in the previous permit. The SIP specifies that interim effluent limitations, if required, must be based on current treatment facility performance or on existing permit limitations whichever is more stringent. In determining what constitutes "recent plant performance", best professional judgment (**BPJ**) was used. Effluent monitoring data collected from 1999 to 2001 are considered representative of recent plant performance. These data specifically account for flow variation due to wet and dry years.

2. Impaired Water Bodies in 303(d) List

The USEPA Region 9 office approved the State's 303(d) list of impaired waterbodies on May 12, 1999. The list was prepared in accordance with section 303(d) of the CWA to identify specific water bodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations on point sources. Suisun Bay and Carquinez Strait are listed for copper,

mercury, nickel, selenium, dioxin compounds, furan compounds, chlordane, DDT, diazinon, dieldrin, and PCBs.

The SIP requires final effluent limits for all 303(d)-listed pollutants to be based on total maximum daily loads **(TMDLs)** and wasteload allocation **(WLA)** results. The SIP and federal regulations also require that final concentration limits be included for all pollutants with reasonable potential). The SIP requires that where the Discharger has demonstrated infeasibility to meet the final limits, interim concentration limits, and performance-based mass limits for bioaccumulative pollutants, be established in the permit with a compliance schedule in effect until final effluent limits are adopted. The SIP also requires the inclusion of appropriate provisions for waste minimization and source control.

3. Basis for Prohibitions

a) Prohibition A.1 (no discharges other than as described in the permit): This prohibition is based on the Basin Plan, previous Order, and BPJ.

b) Prohibition A.2 (10:1 dilution): This prohibition is based on the Basin Plan. The Basin Plan prohibits discharges not receiving a minimum dilution of 10:1 (Chapter 4, Discharge Prohibition No. 1).

c) Prohibition A.3 (no bypass or overflow): This prohibition is based on the previous Order and BPJ.

4. Basis for Effluent Limitations

a) Effluent Limitations B.1:

The refinery is classified as a "cracking refinery" as defined by the USEPA in 40 CFR § 419.20. Therefore, the USEPA Effluent Guidelines and Standards for Petroleum Refining Point Sources (40 CFR § 419 Subpart B) based on Best Available Technology Economically Achievable (BAT), Best Practicable Control Technology (BPT), and/or Best Conventional Pollutant Control technology (BCT), whichever are more stringent, are applicable to the Discharger.

This section contains production-based mass emission limits for the following constituents: Biochemical oxygen demand (BOD), total suspended solids (TSS), chemical oxygen demand (COD), oil & grease, phenolic compounds, ammonia (expressed as nitrogen), sulfide, and total and hexavalent chromium based on 40 CFR § 419 Subpart B. The application of these guidelines and standards is based on production rates at the refinery. In calculating currently applicable effluent limitations, Board staff has used the maximum annual facility production rate (Year 2000) for 1997-2001. During this period, the annual production rate did vary by more than 20 percent. A detailed description of the methodology and data used to calculate the technology-based effluent limitations is included in **Attachment 1.**

The Discharger has proposed two modifications that would affect the flow to the treatment plant and Outfall 001. The Discharger has proposed to increase production rate capacity from the refinery to a crude throughput of 165,000 barrels per day (represents an 22.2 percent increase in production capacity). For alternative production-based limits, the Discharger has requested that the Board base them on a crude throughput of 150,000 barrels per day. The Discharger has also proposed to route asphalt plant process wastewater to the treatment plant and Outfall 001 instead of the local POTW. These modifications would lead to increased allowances under 40 CFR §

419 Subpart B. Therefore, the Order includes alternative limits that would apply when these changes occur. The Board will not apply higher limitations until the Executive Officer indicates in writing that the Discharger has provided adequate documentation that modifications have occurred.

The limits for settleable solids and pH are based on existing limits and the Basin Plan.

The concentration limits for oil and grease are based on existing limits and BPJ.

The facility's ability to comply with all of the limits in B.1 has been demonstrated by existing plant performance.

b) Effluent Limitation B.2:

Concentration limits for pollutants contained in storm water and ballast water are based on existing limits, which were developed from the requirements in 40 CFR Part 419.22(e)(2), 419.23(f)(2), and 419.22(c). The Order retains the requirement that the Discharger record storm water and ballast flow on a daily basis and report daily maximum and monthly average flows. These flows are then used along with the above concentration limits to calculate the mass allowances that are added to the mass limits included in B.1.

Effluent limitations for storm water discharges from Outfalls 002-017 are based on BPJ and are retained from the previous permit except for outfall 017, which was previously regulated by the General Industrial Storm Water Permit.

Toxic Pollutants

c) Effluent Limitation - Whole Effluent Acute Toxicity: The Basin Plan specifies a narrative objective for toxicity, requiring that all waters shall be maintained free of toxic substances in concentrations that are lethal to or produce other detrimental response on aquatic organisms. Detrimental response includes but is not limited to decreased growth rate, decreased reproductive success of resident or indicator species, and/or significant alternations in population, community ecology, or receiving water biota. These effluent toxicity limits are necessary to ensure that this objective is protected. The acute toxicity limit is consistent with the previous permit and is based on the Basin Plan Table 4-2, page 4-69.

d) Effluent Limitation - Chronic Toxicity: The chronic toxicity limit is consistent with the previous permit and is based on the Basin Plan's narrative toxicity definition on page 3-4.

e) Effluent Limitation - Toxic Substances:

1. Reasonable Potential Analysis (RPA):
   40 CFR 122.44(d)(1)(i) specifies that permits are required to include WQBELs for all pollutants "which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard". Thus, the fundamental step in determining whether or not a WQBEL is required is to assess a pollutant's reasonable potential of excursion of its applicable WQO or WQC. The following section describes the RPA methodology and the results of such an analysis for the pollutants identified in the Basin Plan and the CTR.

i) *WQOs and WQC*: The RPA involves the comparison of effluent data with appropriate WQOs including narrative toxicity objectives in the Basin Plan, applicable WQC in the CTR/NTR, and USEPA's 1986 Quality Criteria for Water. The Basin Plan objectives and CTR criteria are shown in **Attachment 2** of this Fact Sheet.

ii) *Methodology*: The RPA is conducted using the method and procedures prescribed in Section 1.3 of the SIP. Board staff have analyzed the effluent and background data and the nature of facility operations to determine if the discharge has reasonable potential to cause or contribute to exceedances of applicable WQOs or WQC. **Attachment 2** of this Fact Sheet shows the step-wise process described in Section 1.3 of the SIP.

iii) *Effluent and background data*: The RPA is based on effluent data collected by the Discharger from 1999 through 2001 for metals, cyanide, benzene, toluene, and fluoranthene (see **Attachment 2** of this Fact Sheet). In determining reasonable potential for other organic pollutants, effluent data provided in the Report of Waste Discharge were reviewed (see **Attachment 2** of this Fact Sheet). Water quality data collected from 1993 to 2000 at the Yerba Buena Island and Richardson Bay monitoring stations through the Regional Monitoring Program (RMP) were reviewed to determine the maximum observed background values. The RMP stations at Yerba Buena Island and Richardson Bay have been sampled for most of the inorganic and some of the organic toxic pollutants. However, not all the constituents listed in the CTR were analyzed by the RMP during this time. This data gap is addressed by issuance of a technical information request (13267) letter dated August 6, 2001 by Board staff, entitled Requirement for Monitoring of Pollutants in Effluent and Receiving Water to Implement New Statewide Regulations and Policy.

iv) *RPA determination*: The RPA results are shown below in **Table B** and **Attachment 2** of this Fact Sheet. Pollutants that exhibit a RP are hexavalent chromium, copper, lead, mercury, nickel, selenium, zinc, cyanide, 4,4'-DDE, dieldrin, dioxin TEQ, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and total PCBs.

Table B. Summary of Reasonable Potential Results

# in CTR	PRIORITY POLLUTANTS	MEC or Minimum DL[1] (µg/L)	Governing WQO/WQC (ug/L)	Maximum Background (µg/L)	RPA Results[2]
2	Arsenic	2.5	36	2.46	N
4	Cadmium	**0.56**	0.62	0.1268	N
5b	Chromium (VI)	**18**	11	4.4	Y
6	Copper	**35.2**	3.7	2.45	Y
7	Lead	**8**	1.2	0.8	Y
8	Mercury	**0.053**	0.025	0.0064	Y
9	Nickel	**76.1**	7.1	3.7	Y
10	Selenium	**44**	5	0.39	Y
11	Silver	1	1.07	0.0683	N

# in CTR	PRIORITY POLLUTANTS	MEC or Minimum DL[1] (µg/L)	Governing WQO/WQC (ug/L)	Maximum Background (µg/L)	RPA Results[2]
13	Zinc	**102**	54.89	4.6	Y
14	Cyanide	**50**	1	NA	Y
16	2,3,7,8-TCDD (Dioxin)	0.00000384	1.4E-08	NA	Y[3]
17	Acrolein	20	780	NA	N
18	Acrylonitrile	20	0.66	NA	N
19	Benzene	1	71	NA	N
20	Bromoform	1	360	NA	N
21	Carbon Tetrachloride	1	4.4	NA	N
22	Chlorobenzene	1	21000	NA	N
23	Chlordibromomethane	1	34	NA	N
24	Chloroethane	1	NA	NA	Uo
25	2-Chloroethylvinyl Ether	1	NA	NA	Uo
26	Chloroform	1	NA	NA	Uo
27	Dichlorobromomethane	1	46	NA	N
28	1,1-Dichloroethane	1	NA	NA	Uo
29	1,2-Dichloroethane	1	99	NA	N
30	1,1-Dichloroethylene	1	3.2	NA	N
31	1,2-Dichloropropane	1	39	NA	N
32	1,3-Dichloropropylene	1	1700	NA	N
33	Ethylbenzene	1	29000	NA	N
34	Methyl Bromide	1	4000	NA	N
35	Methyl Chloride	1	NA	NA	Uo
36	Methylene Chloride	1	1600	NA	N
37	1,1,2,2-Tetrachloroethane	1	11	NA	N
38	Tetrachloroethylene	1	8.85	NA	N
39	Toluene	1	200000	NA	N
40	1,2-Trans-Dichloroethylene	1	140000	NA	N
41	1,1,1-Trichloroethane	1	NA	NA	Uo
42	1,1,2-Trichloroethane	1	42	NA	N
43	Trichloroethylene	1	81	NA	N
44	Vinyl Chloride	1	525	NA	N
45	Chlorophenol	5	400	NA	N
46	2,4-Dichlorophenol	5	790	NA	N
47	2,4-Dimethylphenol	5	2300	NA	N
48	2-Methyl-4,6-Dinitrophenol	24	765	NA	N
49	2,4-Dinitrophenol	42	14000	NA	N
50	2-Nitrophenol	5	NA	NA	Uo
51	4-Nitrophenol	5	NA	NA	Uo
52	3-Methyl-4-Chlorophenol	5	NA	NA	Uo
53	Pentachlorophenol	5	7.9	NA	N
55	2,4,6-Trichlorophenol	5	6.5	NA	N
56	Acenaphthene	5	2700	0.0015	N
57	Acenaphthylene	5	NA	0.00053	Uo
58	Anthracene	5	110000	0.005	N
59	Benzidine	44	0.00054	NA	N
60	Benzo(a)Anthracene	5	0.049	0.0053	Y[3]
61	Benzo(a)Pyrene	5	0.049	0.00029	Y[3]

# in CTR	PRIORITY POLLUTANTS	MEC or Minimum DL[1] (µg/L)	Governing WQO/WQC (ug/L)	Maximum Background (µg/L)	RPA Results[2]
62	Benzo(b)Fluoranthene	5	0.049	0.0046	Y[3]
63	Benzo(ghi)Perylene	5	NA	0.0027	Uo
64	Benzo(k)Fluoranthene	5	0.049	0.0015	Y[3]
65	Bis(2-Chloroethoxy)Methane	5	NA	NA	Uo
66	Bis(2-Chloroethyl)Ether	6	1.4	NA	N
67	Bis(2-Chloroisopropyl)Ether	6	170000	NA	N
68	Bis(2-Ethylhexyl)Phthalate	5	5.9	NA	N
69	4-Bromophenyl Phenyl Ether	5	NA	NA	Uo
70	Butylbenzyl Phthalate	5	5200	NA	N
71	2-Chloronaphthalene	5	4300	NA	N
72	4-Chlorophenyl Phenyl Ether	5	NA	NA	Uo
73	Chrysene	5	0.049	0.0024	Y[3]
74	Dibenzo(a,h)Anthracene	5	0.049	0.00064	Y[3]
75	1,2 Dichlorobenzene	5	17000	NA	N
76	1,3 Dichlorobenzene	5	2600	NA	N
77	1,4 Dichlorobenzene	5	2600	NA	N
78	3,3-Dichlorobenzidine	17	0.077	NA	N
79	Diethyl Phthalate	5	120000	NA	N
80	Dimethyl Phthalate	5	2900000	NA	N
81	Di-n-Butyl Phthalate	5	12000	NA	N
82	2,4-Dinitrotoluene	6	9.1	NA	N
83	2,6-Dinitrotoluene	5	NA	NA	Uo
84	Di-n-Octyl Phthalate	5	NA	NA	Uo
85	1,2-Diphenylhydrazine	10	0.54	NA	N
86	Fluoranthene	0.025	370	0.011	N
87	Fluorene	5	14000	0.00208	N
88	Hexachlorobenzene	5	0.00077	0.0000202	N
89	Hexachlorobutadiene	5	50	NA	N
90	Hexachlorocyclopentadiene	5	17000	NA	N
91	Hexachloroethane	5	8.9	NA	N
92	Indeno(1,2,3-cd) Pyrene	5	0.049	0.004	Y[3]
93	Isophorone	5	600	NA	N
94	Naphthalene	5	NA	0.0023	Uo
95	Nitrobenzene	5	1900	NA	N
96	N-Nitrosodimethylamine	5	8.1	NA	N
97	N-Nitrosodi-n-Propylamine	5	1.4	NA	N
98	N-Nitrosodiphenylamine	5	16	NA	N
99	Phenanthrene	5	NA	0.0061	Uo
100	Pyrene	5	11000	0.0051	N
101	1,2,4-Trichlorobenzene	5	NA	NA	Uo
102	Aldrin	0.04	0.00014	NA	N
103	alpha-BHC	0.03	0.013	NA	N
104	beta-BHC	0.06	0.046	NA	N
105	gamma-BHC	0.09	0.063	NA	N
106	delta-BHC	0.04	NA	NA	Uo
107	Chlordane	1	0.00059	0.00018	N
108	4,4'-DDT	0.11	0.00059	0.000066	N

# in CTR	PRIORITY POLLUTANTS	MEC or Minimum DL[1] (µg/L)	Governing WQO/WQC (ug/L)	Maximum Background (µg/L)	RPA Results[2]
109	4,4'-DDE	0.04	0.00059	0.00069	Y
110	4,4'-DDD	0.12	0.00084	0.000313	N
111	Dieldrin	0.02	0.00014	0.000264	Y
112	alpha-Endosulfan	0.14	0.0087	0.000031	N
113	beta-Endosulfan	0.04	0.0087	0.000069	N
114	Endosulfan Sulfate	0.66	240	0.0000819	N
115	Endrin	0.06	0.0023	0.000036	N
116	Endrin Aldehyde	0.23	0.81	NA	N
117	Heptachlor	0.03	0.00021	0.000019	N
118	Heptachlor Epoxide	0.83	0.00011	0.000094	N
119-125	PCBs	1	0.00017	NA	Y[3]
126	Toxaphene	1	0.0002	NA	N
	Tributyltin	NA	0.005	NA	Ub, Ud

1) Maximum Effluent Concentration (MEC) in bold is the actual detected MEC, otherwise the MEC shown is the minimum detection level.
NA = Not Available (there is not monitoring data for this constituent).

2) RP =Yes, if either MEC or Background > WQO/WQC.
RP = No, if (1) both MEC and background < WQO/WQC or (2) no background and all effluent data non-detect, or no background and MEC<WQO/WQC (per WQ 2001-16 Napa Sanitation Remand)
RP = Ud (undetermined due to lack of effluent monitoring data).
RP = Uo (undetermined if no objective promulgated).
RP = Ub (undetermined due to lack of background data)

3) RP = Yes, because limits for these pollutants were included in the previous Order and Board staff have determined that there is reasonable potential based on BPJ and the nature of refinery discharges.

v) *Organic constituents with limited data*: Reasonable potential could not be determined for some of the organic priority or toxic pollutants due to (i) WQOs/WQC that are lower than current analytical techniques can measure, (ii) the absence of applicable WQOs or WQCs, or (iii) the absence of background data. As required by the August 6, 2001 letter from Board staff to all permittees, the Discharger is required to initiate or continue to monitor for those pollutants in this category using analytical methods that provide the best detection limits reasonably feasible. These pollutants' reasonable potential will be reevaluated in the future to determine whether there is a need to add numeric effluent limits to the permit or to continue monitoring.

vi) *Pollutants with no reasonable potential*: WQBELs are not included in the Order for constituents that do not have reasonable potential to cause or contribute to exceedance of applicable WQOs or WQC. However, monitoring for those pollutants is still required, as specified in the August 6, 2001 letter. If concentrations or mass loads of these constituents were found to have increased significantly, the Discharger will be required to investigate the source(s) of the increase(s). Remedial measures are required if the increases pose a threat to water quality in the receiving water.

vii) *Permit Reopener:* The permit includes a reopener provision to allow numeric effluent limits to be added for any constituent that in the future exhibits reasonable potential to cause or contribute to exceedance of a WQO or WQC. This determination, based on monitoring results, will be made by the Board.

2. Final Water Quality-Based Effluent Limits: The final WQBELs were developed for the toxic and priority pollutants that were determined to have reasonable potential to cause or contribute to exceedances of the WQOs or WQC. Final effluent limitations were calculated based on appropriate WQOs/WQC, background concentrations at the Yerba Buena Island and Richardson Bay RMP Stations, a maximum dilution ratio of 10:1 (for non-bioaccumulative pollutants), and the appropriate procedures specified in Section 1.4 of the SIP (See **Attachment 3** of this Fact Sheet). For the purpose of the Proposed Order, final WQBELs refer to all non-interim effluent limitations. The WQO or WQC used for each pollutant with reasonable potential is indicated in Table C below as well as in **Attachment 3**.

   Board staff believes a conservative limit of 10:1 dilution credit for discharges to the Bay is necessary for protection of beneficial uses. The basis for limiting the dilution credit is based on SIP provisions in Section 1.4.2. The following outlines the basis for derivation of the dilution credit:

   a. A far-field background station is appropriate because the receiving waterbody (Bay) is a very complex estuarine system with highly variable and seasonal upstream freshwater inflows and diurnal tidal saltwater inputs.
   b. Due to the complex hydrology of the San Francisco Bay, a mixing zone cannot be accurately established.
   c. Previous dilution studies do not fully account for the cumulative effects of other wastewater discharges to the system.
   d. The SIP allows limiting a mixing zone and dilution credit for persistent pollutants (e.g., copper, silver, nickel and lead).

   The main justification for using a 10:1 dilution credit is uncertainty in accurately determining ambient background and uncertainty in accurately determining the mixing zone in a complex estuarine system with multiple wastewater discharges.

a. **Complex Estuarine System Necessitates Far-Field Background** - The SIP allows background to be determined on a discharge-by-discharge or water body-by-water body basis (SIP section 1.4.3). Consistent with the SIP, Board staff has chosen to use a water body-by-water body basis because of the uncertainties inherent in accurately characterizing ambient background in a complex estuarine system on a discharge-by-discharge basis.

With this in mind, the Yerba Buena Island and Richardson Bay Stations fit the guidance for ambient background in the SIP compared to other stations in the Regional Monitoring Program. The SIP states that background data are applicable if they are "representative of the ambient receiving water column that will mix with the discharge." Board Staff believe that data from these stations are representative of water that will mix with the discharge from Outfall 001. Although these stations are located near the Golden Gate, they would represent the typical water flushing in and out in the Bay Area each tidal cycle. For most of the Bay Area, the waters represented by these stations make up a large part of the receiving water that will mix with the discharge.

b. **Uncertainties Prevent Accurate Mixing Zones in Complex Estuarine Systems** -There are uncertainties in accurately determining the mixing zones for each discharge. The models that have been used by dischargers to predict dilution have not considered the three-dimensional nature of the currents in the estuary resulting from the interaction of tidal flushes and seasonal

fresh water outflows. Salt water is heavier than fresh water. Colder salt water from the ocean flushes in twice a day generally under the warmer fresh rivers waters that flows out annually. When these waters mix and interact, complex circulation patterns occur due to the different densities of these waters. These complex patterns occur throughout the estuary but are most prevalent in the San Pablo Bay, Carquinez Strait, and Suisun Bay areas. The locations change depending on the strength of each tide and the variable rate of delta outflow. Additionally, sediment loads to the Bay from the Central Valley also change on a longer-term basis. These changes can result in changes to the depths of different parts of the Bay making some areas more shallow and/or other areas more deep. These changes affect flow patterns that in turn can affect the initial dilution achieved by a discharger's diffuser.

c. **Dye studies do not account for cumulative effects from other discharges** - The tracer and dye studies conducted are often not long enough in duration to fully assess the long residence time of a portion of the discharge that is not flushed out of the system. In other words, some of the discharge, albeit a small portion, makes up part of the dilution water. So unless the dye studies are of long enough duration, the diluting effect on the dye measures only the initial dilution with "clean" dilution water rather than the actual dilution with "clean" dilution water plus some amount of original discharge that resides in the system. Furthermore, both models and dye studies that have been conducted have not considered the effects of discharges from other nearby discharge sources, nor the cumulative effect of discharges from over 20 other major dischargers to San Francisco Bay system. While it can be argued the effects from other discharges are accounted for by factoring in the local background concentration in calculating the limits, accurate characterization of local background levels are also subject to uncertainties resulting from the interaction of tidal flushing and seasonal fresh water outflows described above.

d. **Mixing Zone Is Further Limited for Persistent Pollutants** - Discharges to the Bay Area waters are not completely-mixed discharges as defined by the SIP. Thus, the dilution credit should be determined using site-specific information for incompletely-mixed discharges. The SIP in section 1.4.2.2 specifies that the Regional Board "significantly limit a mixing zone and dilution credit as necessary... For example, in determining the extent of ... a mixing zone or dilution credit, the RWQCB shall consider the presence of pollutants in the discharge that are ... persistent." The SIP defines persistent pollutants to be "substances for which degradation or decomposition in the environment is nonexistent or very slow." The pollutants at issue here are persistent pollutants (e.g., copper, lead, nickel). The dilution studies that estimate actual dilution do not address the effects of these persistent pollutants in the Bay environment, such as their long-term effects on sediment concentrations."

Table C. Water Quality Objectives/Criteria for Pollutants with RP

Pollutant	Chronic WQO/WQC (µg/L)	Acute WQO/WQC (µg/L)	Basis of Lowest WQO/WQC Used in RP
Chromium (VI)	11	16	Basin Plan
Copper	3.7	5.8	CTR
Lead	1.18	30.4	Basin Plan
Mercury	0.025	2.1	Basin Plan
Nickel	7.1	140	Basin Plan
Selenium	5	20	NTR
Zinc	54.89	60.61	Basin Plan
Cyanide	1	1	CTR

Pollutant	Chronic WQO/WQC (µg/L)	Acute WQO/WQC (µg/L)	Basis of Lowest WQO/WQC Used in RP
Dioxin	1.4E-08	--	CTR
4,4'-DDE	0.00059	--	CTR
Dieldrin	0.00014	--	CTR
Benzo(a)Anthracene	0.049	--	CTR
Benzo(a)Pyrene	0.049	--	CTR
Benzo(b)Fluoranthene	0.049	--	CTR
Chrysene	0.049	--	CTR
Dibenzo(a,h)Anthracene	0.049	--	CTR
Indeno(1,2,3-cd)Pyrene	0.049	--	CTR
PCBs (sum)	0.00017	--	CTR

3. Interim Limits: Interim effluent limitations were derived for those constituents for which the Discharger has shown infeasibility of complying with the respective limits and has demonstrated that compliance schedules are justified based on the Discharger's source control and pollution minimization efforts in the past and continued efforts in the present and future. An interim effluent limitation is also provided for cyanide for which there is currently insufficient data to develop final WQBELs. For copper, lead, and cyanide, there were insufficient effluent data (i.e., detected values) to develop statistically valid performance-based interim limits. For cyanide, the interim effluent concentration limits was based on the previous Order limits. For mercury, the interim effluent limit was based on a statistical analysis of "low detection limit" (ultraclean) mercury data pooled from the refinery dischargers in the Region. For lead, the previous Order did not include an effluent limit. Since existing monitoring is insufficient to calculate a meaningful performance-based limit for lead, this Order requires weekly monitoring with a detection limit lower than the water quality objective. For cyanide, the final WQBEL will likely be calculated based on additional ambient background information and/or a cyanide site-specific objective (SSO). Interim performance-based mass limits have also been established for mercury and selenium. The interim limits are discussed in more detail below.

4. Compliance Schedules and Infeasibility Analysis

   The Discharger submitted infeasibility to comply reports on July 29, 2002 for selenium, mercury, nickel, copper, lead, dioxin, 4,4-DDE, and dieldrin. For constituents that Board staff could perform a meaningful statistical analysis (i.e., selenium and nickel), it used self-monitoring data from 1999-2001 to compare the mean, 95th percentile, and 99th percentile with the long-term average (LTA), AMEL, and MDEL to confirm if it is feasible for the Discharger to comply with WQBELs. If the LTA, AMEL, and MDEL all exceed the mean, 95th percentile, and 99th percentile, it is feasible for the Discharger to comply with WQBELs. The table D below shows these comparisons in µg/L::

Table D: Summary of Feasibility Analysis

Constituent	Mean / LTA	95th / AMEL	99th / MDEL	Feasible to Comply
Selenium	23.3 > 3.6	34.0 > 4.5	43.5 > 6.7	No
Nickel	14.4 < 19.5	32.6 > 30.7	62.1 < 62.5	No

For the remaining constituents (copper, lead, and mercury) Board staff compared the MEC to the lowest WQBEL(both in µg/L) to determine if the Discharger can achieve immediate compliance with the final limits (see Table E below).

Table E: Summary of Feasibility Analysis

Constituent	AMEL	MDEL	MEC	Is MEC > AMEL	Feasible to Comply
Copper	11	27	35.2	Yes	No
Mercury	0.02	0.04	0.053	Yes	No
Lead	3.9	7.9	8.0	Yes	No

For Dioxin TEQ, Valero has not detected these compounds in its discharge. However, the detection limits are above the WQBELs. In such cases, compliance would be determined at the MLs. Since the SIP has not established MLs for these compounds, Valero's ability to comply cannot be determined. Board staff is working with discharger associations to establish MLs for dioxin TEQ for use in compliance determination.

For 4,4-DDE, and dieldrin, Board staff did not confirm that it is infeasible for the Discharger to comply with final WQBELs. The Discharger indicated that it cannot comply with final WQBELs for 4,4-DDE and dieldrin as (a) analytical methods cannot detect and quantify 4,4-DDE and dieldrin at proposed effluent limits and (b) the refinery is not a known source of these contaminants, and therefore, it does not have a practical means to reduce the source(s) of these contaminants. Since the proposed Order basis compliance for 4,4-DDE and dieldrin at the minimum detection level, the Discharger has never detected either constituent in its effluent, and no known sources of these constituents exist, it is appropriate for the Discharger to immediately comply with final WQBELs.

It is infeasible for the Discharger to immediately comply with WQBELs calculated according to Section 1.4 of the SIP for copper, lead, mercury, nickel, selenium, and dioxin. Therefore, this permit establishes a five-year compliance schedule for final limits based on CTR or NTR criteria (i.e., copper and selenium) and a compliance schedule of March 31, 2010 for final limits based on the Basin Plan objectives (i.e., mercury, lead, and nickel). The five-year and March 31, 2010 compliance schedules both exceed the length of the permit; therefore, these calculated final limits are intended for point of reference for the feasibility demonstration. The Order also establishes a ten year compliance schedule for dioxin TEQ. Additionally, the actual final WQBELs for copper, mercury, nickel, and selenium may be based on either SSOs or the TMDLs/WLAs. For lead, a TMDL is not planned, so this Order specifies a compliance schedule with interim tasks for achieving compliance with the final limits. Justification for these time frames are indicated in Attachment 6.

Pursuant to the SIP (Section 2.2.2, Interim Requirements for Providing Data), where available data are insufficient to calculate a final effluent limit (e.g., cyanide), a data collection period of May 18, 2003 is established. This Order contains a provision requiring the Discharger to join a group study for ambient background data collection and to determine SSOs. The Discharger is required to participate in the studies and submit reports to the Board by 2003. The Board intends to include, in a subsequent

permit revision, a final limit based on the study results. However, if the Discharger requests and demonstrates that it is infeasible to comply with the revised final limit, the permit revision will establish a maximum five-year compliance schedule.

During the compliance schedules, interim limits are included based on current treatment facility performance or on existing permit limits, whichever is more stringent to maintain existing water quality. The Board may take appropriate enforcement actions if interim limits and requirements are not met.

f) Copper – Further Discussion and Rationale for Interim Effluent Limitation: Interim effluent limitations are required for copper since the effluent limitations calculated according to the SIP will be infeasible to meet. The SIP requires the interim numeric effluent limit for the pollutant be based on either current treatment facility performance, or on the previous Order's limitation, whichever is more stringent. Board staff considered self-monitoring data from 1999-2001 (copper concentrations ranged from < 10 µg/L to 35.2 µg/L). However, the data only contained 11 detected values out of 36 samples, and therefore, it was not possible to perform a meaningful statistical evaluation of current treatment performance. The SIP requires the interim numeric effluent limit for the pollutant be based on either current treatment facility performance, or on the previous Order's limitation, whichever is more stringent. As current sample results for copper are not sufficient to perform a meaningful analysis, this Order retains the copper limit of 36 µg/L from the previous permit.

g) Mercury - Further Discussion and Rationale for the Interim Effluent Limitations: Interim effluent concentration limitations are required for mercury since the Discharger has demonstrated that the effluent limitations calculated according to the SIP will be infeasible to meet. Effluent data for the Discharger's facility are limited because only since 2000 have refineries begun using ultra-clean methods to analyze for mercury. Regional Board staff performed a statistical analysis of "low detection limit" (ultraclean) mercury data pooled from the refinery dischargers in the Region. The purpose of the study was to evaluate the feasibility of establishing a region-wide interim performance-based effluent limitation for mercury. In light of the similarities between refineries regarding the nature of their process wastes and treatment technologies involved, it is reasonable to pool the ultraclean mercury data from the refineries to enable a statistical approach to setting an interim limit based on best available information and performance. Statistical analysis from this pooled data set results in a uniform, performance-based interim, monthly average mercury effluent limit of 0.075 µg/L that is applicable to refinery discharges. The previous Order includes a monthly average limit of 0.21 µg/L and a daily average limit 1 µg/L.

This Order also establishes a running average mercury, mass-based effluent limitation of 0.014 kilograms per month. This limit was set at a value corresponding to three standard deviations above the mean of the running annual average mass emission values for 1999-2001 (See **Attachment 4** to this Fact Sheet). This mass-based effluent limitation maintains current loadings until a TMDL is established and is consistent with state and federal antidegradation and antibacksliding requirements. The final mass based effluent limitation will be based on the WLA derived from the mercury TMDL.

h) Nickel - Further Discussion and Rationale for the Interim Effluent Limitation: Interim effluent concentration limitations are required for nickel since the Discharger has demonstrated that the final average monthly limit calculated according to the SIP will be infeasible to meet. Self-monitoring data from 1999 to 2001 indicate that effluent nickel concentrations ranged from < 5 µg/L to 76 µg/L and that 25 out of 153 data points (16.3%) were nondetect. Board staff

calculated an interim performance-based limit of 70.6 µg/L (3 standard deviations above the mean), which exceeds the limit of 65 µg/L contained in the previous permit (see Attachment 5 of the Fact Sheet). To comply with antibacksliding requirements, this Order retains the nickel limit from the previous permit.

i) Selenium - Further Discussion and Rationale for Interim Effluent Limitations: Interim concentration effluent limitations are required for selenium since the Discharger has demonstrated that the final average monthly limit calculated according to the SIP will be infeasible to meet. An interim mass limit is required because selenium is bioaccumulative and the receiving waters are listed as impaired due to selenium. Interim limits for selenium are the same as the limits included in the previous Order and are based on a Settlement Agreement between the Western States Petroleum Association (WSPA) and the Board. The previous permit and Settlement Agreement contain a daily maximum concentration limit of 50 µg/L and an annual average mass emission limit of 0.96 lb per day.

j) Cyanide – Further Discussion and Rationale for Interim Effluent Limitations: Interim effluent limitations are required for cyanide since it is not currently possible to calculate final WQBELs. There are no ambient background data available from either the Yerba Buena Island or Richardson Bay Stations. Ambient cyanide data are being collected as required by the August 6, 2001 letter. The final WQBEL will be recalculated based on additional ambient background information, and/or a cyanide SSO. Effluent data from 1999-2001 was considered to develop an interim concentration-based effluent limitation. The limited data (six detected values out of 153) preclude any meaningful evaluation of current treatment performance for this parameter. The MEC is 50 µg/L. The previous permit includes a daily average cyanide effluent limit of 25 µg/L. Therefore, the interim limit is the previous permit limit of 25 µg/L.

5. Basis for Receiving Water Limitations

a) Receiving water limitations C.1, C.2, and C.3 (conditions to be avoided): These limits are based on the previous Order and the narrative/numerical objectives contained in Chapter 3 of the Basin Plan, page 3-2 – 3-5.

b) Receiving water limitation C.4 (compliance with State Law): This requirement is in the previous permit, requires compliance with Federal and State law, and is self-explanatory.

6. Basis for Self-Monitoring Requirements

The SMP includes monitoring at the outfalls for conventional, non-conventional, and toxic pollutants, and acute and chronic toxicity. For a number of constituents that the Board has granted interim limits (copper, nickel, selenium, and cyanide), this Order contains weekly monitoring. The two exceptions to this requirement are mercury and dioxin TEQ. Additional cost and effort is required for ultra-clean mercury monitoring, thus this Order requires monthly monitoring. For dioxins and furans, due to the considerable costs and the non-detects the Discharger has found, this Order requires twice yearly monitoring, which is also consistent with the SIP. In order to determine an appropriate limit for lead, this Order requires weekly monitoring at a detection limit below the most stringent water quality objective. Additionally, this Order requires monthly monitoring for individual PAHs to demonstrate compliance with final effluent limits. This is consistent with the previous monthly monitoring required to demonstrate compliance with the total PAH limitation. Further, this Order requires twice yearly monitoring for PCBs, dieldrin and 4,4'-DDE to demonstrate compliance with final effluent limitations. In lieu of near field discharge specific ambient

monitoring, it is acceptable that the Discharger participate in collaborative receiving water monitoring with other dischargers under the provisions of the August 6, 2001 letter, and the RMP.

7. Basis for Provisions

a) Provisions D.1. (Permit Compliance and Rescission of Previous Permit): Time of compliance is based on 40 CFR 122. The basis of this Order superceding and rescinding the previous permit Order is 40 CFR 122.46.

b) Provision D.2 (Antidegradation Report). This provision is based on State Water Resources Control Board Resolution No. 68-16, which requires the Board in regulating the discharge of waste to maintain high quality waters of the state (the Discharger must demonstrate that it has implemented adequate controls (e.g., adequate treatment capacity) to ensure that high quality waters will be maintained.

c) Provision D.3 (Increase in Crude Throughput). This provision requires the Discharger to certify that it has increased crude throughput for it to obtain higher production-based effluent limits.

d) Provision D.4 (Treatment of Asphalt Plant Wastewater). This provision requires the Discharger to certify that is has permanently routed asphalt plant wastewater to its WWTP for it to obtain higher production-based effluent limits.

e) Provision D.5 (Mass and Concentration Credits). This provision is necessary to protect beneficial uses identified in the Basin Plan (the Discharger must ensure that granting it pollutant credits for the use of recycled water will not cause acute toxicity).

f) Provision D.6. (Storm Water Pollution Prevention Plan and Annual Report): This provision, is based on and consistent with Basin Plan objectives, statewide storm water requirements for industrial facilities, and applicable USEPA regulations.

g) Provision D.7. (Cyanide Study and Schedule - Site-Specific Objective Study for Cyanide): This provision, based on BPJ, requires the Discharger to characterize background ambient cyanide concentrations and to participate in an on-going group effort to develop a SSO for cyanide.

h) Provision D.8. (Lead Compliance Schedule). This provision is required as the Discharger cannot currently comply with final WQBELs for lead. The final limitations will not change because neither a TMDL nor a site specific objective is under development for this constituent. SIP 2.2.1 requires the establishment of interim requirements and dates for their achievement in the permit.

i) Provision D.9 (Effluent Characterization for Selected Constituents): This provision establishes monitoring requirements as stated in the Board's August 6, 2001 Letter under Effluent Monitoring for major dischargers. Interim and final reports shall be submitted to the Board in accordance with the schedule specified in the August 6, 2001 Letter. This provision is based on the Basin Plan and the SIP.

j) Provision D.10 (Receiving Water Monitoring). This provision, which requires the Discharger to continue to conduct receiving water monitoring is based on the previous Order and the Basin Plan.

k) Provision D.11 (Pollutant Prevention and Minimization Program): This provision is based on the Basin Plan, page 4-25 – 4-28, and the SIP, Section 2.1, Compliance Schedules.

l) Provision D.12. (Whole Effluent Acute Toxicity): This provision establishes conditions by which compliance with permit effluent limits for acute toxicity will be demonstrated. Conditions initially include the use of 96-hour static renewal bioassays, the use of fathead minnows and three-spine stickleback as the test species, and use of approved test methods as specified. On April 1, 2003, the Discharger shall switch from the 3rd to 4th Edition USEPA protocol including use of flow through bioassays, unless the Discharger meets specific requirements for continued use of static renewal tests. These conditions are based on the effluent limits for acute toxicity given in the Basin Plan, Chapter 4, and BPJ.

m) Provision D.13. (Whole Effluent Chronic Toxicity): This provision establishes conditions and protocols by which compliance with the Basin Plan narrative WQO for toxicity will be demonstrated. Conditions include required monitoring and evaluation of the effluent for chronic toxicity and numerical values for chronic toxicity evaluation to be used as 'triggers' for initiating accelerated monitoring and toxicity reduction evaluation(s). The conditions in the draft permit for chronic toxicity are based on the Basin Plan narrative WQO for toxicity, Basin Plan effluent limits for chronic toxicity (Basin Plan, Chapter 4), USEPA and SWRCB Task Force guidance, applicable federal regulations [40 CFR 122.44(d)(1)(v)], and BPJ.

n) Provision D.14. (Toxicity Identification Evaluation / Toxicity Reduction Evaluation). This provision is based on the Basin Plan and requires the Discharger to implement toxicity identification and reduction evaluations when there is consistent chronic toxicity in the discharge.

o) Provision D.15 (Screening Phase Compliance Monitoring). This requirement is based on the previous permit and the Basin Plan. New testing species and/or test methodology may be available before the next permit renewal. Characteristics, and thus toxicity, of the process wastewater may also change during the life of the permit. This screening phase monitoring is important to help determine which test species is most sensitive to effluent for future compliance monitoring.

p) Provision D.16 (Optional Mass Offset): This option is provided to encourage the Discharger to implement aggressive reduction of mass loads to Carquinez Strait and Suisun Bay.

q) Provision D.17. (Copper Translator Study and Schedule): This provision is based on BPJ and the SIP and allows the Discharger to conduct an optional copper translator study. Under this provision, the Discharger could gather site-specific information in order to apply a different translator from the default translator specified in the CTR and SIP.

r) Provision D.18. (Contingency Plan, Review, and Status Reports) : This provision is based on the requirements stipulated in Board Resolution No. 74-10.

s) Provision D.19. (303(d)-listed Pollutants Site-Specific Objective and TMDL Status Review): This provision requires participation in the development of TMDLs or SSOs for copper, nickel, mercury, selenium, DDT, dieldrin, and dioxin. By January 31 of each year, the Discharger shall submit an update to the Board to document progress made on source control and pollutant minimization measures and development of TMDLs or SSOs. Regional Board staff shall review the status of TMDL development. This Order may be reopened in the future to reflect any changes required by TMDL development.

t) Provision D.20. (Self-Monitoring Program): The Discharger is required to conduct monitoring of the permitted discharges in order to evaluate compliance with permit conditions. Monitoring requirements are given in the Self Monitoring Program (SMP) of the Permit. This provision requires compliance with the SMP, and is based on 40 CFR 122.44(i), 122.62, 122.63 and 124.5. The SMP is a standard requirement in almost all NPDES permits (including the Order) issued by the Board. In addition to containing definitions of terms, it specifies general sampling/analytical protocols and the requirements of reporting of spills, violations, and routine monitoring data in accordance with NPDES regulations, the California Water Code, and Board's policies. The SMP also contains sampling program specific for the Discharger's facility. It defines the sampling stations and frequency, pollutants to be monitored, and additional reporting requirements. Pollutants to be monitored include all parameters for which effluent limitations are specified.

u) Provision D.21. (Standard Provisions and Reporting Requirements): The purpose of this provision is require compliance with the standard provisions and reporting requirements given in this Board's document titled, Standard Provisions and Reporting Requirements for NPDES Surface Water Discharge Permits, August 1993, or any amendments thereafter. This document is included as part of the permit as an attachment of the permit. Where provisions or reporting requirements specified in the permit are different from equivalent or related provisions or reporting requirements given in 'Standard Provisions', the specifications given in the permit shall apply. The standard provisions and reporting requirements given in the above document are based on various state and federal regulations with specific references cited therein.

v) Provision D.22. (Change in Control or Ownership): This provision is based on 40 CFR 122.61.

w) Provision D.23. (Permit Reopener): This provision is based on 40 CFR 123.

x) Provision D.24. (NPDES Permit /USEPA concurrence): This provision is based on 40 CFR 123.

y) Provision D.25. (Permit Expiration and Reapplication): This provision is based on 40 CFR 122.46 (a).

V. WASTE DISCHARGE REQUIREMENT APPEALS

Any person may petition the State Water Resources Control Board to review the decision of the Board regarding the Waste Discharge Requirements. A petition must be made within 30 days of the Board public hearing.

VI. ATTACHMENTS

Attachment 1: Calculations for Production-Based Effluent Limitations
Attachment 2: RPA Results for Priority Pollutants
Attachment 3: Calculation of Final WQBELs Credit
Attachment 4: Calculation of Mercury Mass Limit
Attachment 5: Calculation of Interim Effluent Concentration Limits
Attachment 6: Basis for compliance schedule time frames.

ATTACHMENT 1

CALCULATIONS FOR PRODUCTION-BASED
BPT, BCT, AND BAT EFFLUENT LIMITATIONS
FOR
VALERO BENICIA REFINERY
(Four Sets of Effluent Limitations)

References:

1) 40 CFR § 419 Subpart B Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category (Cracking Subcategory)
2) Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category
3) Guide for the Application of Effluent Limitations Guidelines for the Petroleum Refining Industry
4) Telephone conversations between Ann La Duca, Tetra Tech, Inc. and Hugh Wise, EPA-Headquarters on June 26, 2002
5) Amended NPDES Application Attachment 2C-IIIC for Permit Reissuance (Attachment dated June 2002)
6) Refinery Production Data January 1997 – April 2001, provided by the facility (Data from January 2000 – December 2000 was selected as the high year based on average production rates and was used in calculations)
7) Asphalt Production Data January 2001- April 2002, provided by the facility

There are four sets of effluent limitations proposed in this Order. As stated in the Fact Sheet, the discharger has proposed two modifications that would affect the flow to the treatment plant and Outfall 001. The Discharger has proposed to increase production rate capacity from the refinery to a crude throughput of 165,000 barrels per day (representing a 22.2 percent increase in production capacity). However, for alternative production-based limits, the Discharger requested that the Board base them on a crude throughput of 150,000 barrels per day. The Discharger has also proposed to route asphalt plant process wastewater to the treatment plant and Outfall 001. These modifications would lead to increased allowances under 40 CFR § 419 Subpart B. The Board will not apply the higher limitations until the Executive Officer indicates in writing that the Discharger has provided adequate documentation that these modifications have occurred and higher limitations are appropriate. The four conditions are described below:

1. The 1st set of effluent limitations apply at the current production rate capacity of 135,000 barrels per day, without the asphalt plant process wastewater directed to the treatment plant and Outfall 001;
2. The 2nd set of effluent limitations apply at the proposed increased production rate capacity of 150,000 barrels per day, without the asphalt plant process wastewater directed to the treatment plant and Outfall 001;
3. The 3rd set of effluent limitations apply at the current production rate capacity, with the asphalt plant process wastewater directed to the treatment plant and Outfall 001; and
4. The 4th set of effluent limits apply at the proposed increased production rate capacity, with the asphalt plant process wastewater directed to the treatment plant and Outfall 001.

I. 1st Set of Production-Based Effluent Limitations

STEP 1: Determine the size factor based on the refinery feedstock rate. Based on 40 CFR § 419 Subpart B, a total refinery throughput of 135 kbbl/d results in a

SIZE FACTOR = 1.35

STEP 2: Determine the process configuration based on the process rates:

Process	Process Feedstock Rate (kbbl/d)	Fraction of Total Throughput	Weight Factor	Process Configuration
Total Refinery Throughput = 135 kbbl/d				
CRUDE:				
Atmospheric Distillation	135	1		
Vacuum Crude Distillation	66.18	0.49		
Desalting	135	1		
TOTAL	336.18	2.49	1	2.49
CRACKING & COKING:				
Fluid Catalytic Cracking	66.73	0.49		
Fluid Coking	26.58	0.20		
Hydrocracking	30.46	0.23		
TOTAL	123.77	0.92	6	5.50
TOTAL PROCESS CONFIGURATION =				7.99

(kbbl/d = Thousand Barrels per day)

STEP 3: Determine the process factor. Based on 40 CFR § 419 Subpart B, a total process configuration of 7.99 results in a

PROCESS FACTOR = 1.41

STEP 4: Based on 40 CFR § 419.22(a), 419.23(a), and 419.24(a), the BPT/BAT/BCT effluent limit is equal to

(THROUGHPUT) X (SIZE FACTOR) X (PROCESS FACTOR) X (EFFLUENT LIMIT FACTOR)

EFFLUENT LIMIT = (135)(1.35)(1.41)(Effluent Limit Factor)
= (256.97)(Effluent Limit Factor)

Effluent Limit in 40 CFR 419B						Multiplier	Final Limit Calculated						Final Limit	
BPT		BAT		BCT			BPT		BAT		BCT			
Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg		Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg
lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl		lb/d	lb/d	lb/d	lb/d	lb/d	lb/d	lb/d	lb/d
9.9	5.5			9.9	5.5	256.97	2,544	1,413			2,544	1,413	2,544	1,413
6.9	4.4			6.9	4.4	256.97	1,773	1,131			1,773	1,131	1,773	1,131
74	38.4	74	38.4			256.97	19,016	9,868	19,016	9,868			19,016	9,868
3	1.6			3	1.6	256.97	771	411			771	411	771	411
0.074	0.036					256.97	19	9					19	9
6.6	3	6.6	3			256.97	1,696	771	1,696	771			1,696	771
0.065	0.029	0.065	0.029			256.97	16.7	7.5	16.7	7.5			16.7	7.5
0.15	0.088					256.97	39	23					39	23
0.012	0.0056					256.97	3	1					3.1	1.4

*The BPT limits for these constituents are applicable only if they are more stringent than BAT limits (see STEP 5) below).

STEP 5: Calculate Amended BAT limits pursuant to 40 CFR § 419.43, for phenolic compounds (4AAP), total and hexavalent chromium. The effluent limit is equal to the sum of the products of each effluent limitation factor times the applicable process feedstock rate.

Pollutant	Process Category	BAT Effluent Limit Factors (lb/kbbl)		Feedstock (kbbl/d)	Effluent Limitation (lb/d)	
		Daily Max.	30-d Average		Daily Max.	30-d Average
Phenolic Compounds (4AAP)	Crude	0.013	0.003	336.18	4.37	1.01
	Cracking & Coking	0.147	0.036	253.37	37.25	9.12
	Reforming & Alkylation	0.132	0.032	67.46	8.90	2.16
				TOTAL	50.52	12.29

				(kg/d)	22.92	5.57
Total Chromium	Crude	0.011	0.004	336.18	3.70	1.34
	Cracking & Coking	0.119	0.041	253.37	30.15	10.39
	Reforming & Alkylation	0.107	0.037	67.46	7.22	2.50
				TOTAL	41.07	14.23
				(kg/d)	18.63	6.45
Hexavalent Chromium	Crude	0.0007	0.0003	336.18	0.24	0.10
	Cracking & Coking	0.0076	0.0034	253.37	1.93	0.86
	Reforming & Alkylation	0.0069	0.0031	67.46	0.47	0.21
				TOTAL	2.63	1.17
				(kg/d)	1.19	0.53

STEP 6: Compare Amended BAT limitations for phenolic compounds (4AAP), total chromium, and hexavalent chromium with BPT limitations.

Except for daily maximum limit for total chromium, and daily maximum and 30-day average limitations for phenolic compounds, the above BAT limits are more stringent than the BPT limits calculated in STEP 4. Therefore, for these constituents, the above BAT limits, the BPT limit for phenolic compounds (daily maximum of 19.02 lb/d, and 30-day average of 9.25 lb/d), and the daily maximum BPT limit and 30-day average BAT limit for total chromium (38.55 lb/d, and 30-day average of 14.23 lb/d) are considered for inclusion in the draft permit.

II. 2nd Set of Production-Based Effluent Limitations

The proposed plant expansion to a crude throughput of 150,00 barrels/day is documented in the "Basis for Amended Production Rates". Proposed production rates for individual processes are also provided in the "Basis for Amended Production Rates".

STEP 1: Determine the size factor based on the refinery feedstock rate. Based on 40 CFR § 419 Subpart B, a total refinery throughput of 150 kbbl/d results in a

SIZE FACTOR = 1.41

STEP 2: Determine the process configuration based on the process rates:

Process	Process Feedstock Rate (kbbl/d)	Fraction of Total Throughput	Weight Factor	Process Configuration
Total Refinery Throughput = 150 kbbl/d				
CRUDE:				
Atmospheric Distillation	150	1		
Vacuum Crude Distillation	82	0.55		
Desalting	150	1		
TOTAL	382	2.55	1	2.55
CRACKING & COKING:				
Fluid Catalytic Cracking	75	0.50		
Fluid Coking	32	0.21		
Hydrocracking	38	0.25		
TOTAL	145	0.97	6	5.80
TOTAL PROCESS CONFIGURATION =				8.35

(kbbl/d = Thousand Barrels per day)

STEP 3: Determine the process factor. Based on 40 CFR § 419 Subpart B, a total process configuration of 8.35 results in a

PROCESS FACTOR = 1.53

STEP 4: Based on 40 CFR § 419.22(a), 419.23(a), and 419.24(a), the BPT/BAT/BCT effluent limit is equal to

(THROUGHPUT) X (SIZE FACTOR) X (PROCESS FACTOR) X (EFFLUENT LIMIT FACTOR)

EFFLUENT LIMIT = (150)(1.41)(1.53)(Effluent Limit Factor)
= (323.6)(Effluent Limit Factor)

Effluent Limit in 40 CFR 419B						Multiplier	Final Limit Calculated						Final Limit	
BPT		BAT		BCT			BPT		BAT		BCT			
Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg		Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg
lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl		lb/d	lb/d	lb/d	lb/d	lb/d	lb/d	lb/d	lb/d
9.9	5.5			9.9	5.5	323.6	3,203.6	1,779.8			3,203.6	1,779.8	3,203.6	1,779.8
6.9	4.4			6.9	4.4	323.6	2,232.8	1,423.8			2,232.8	1,423.8	2,232.8	1,423.8
74	38.4	74	38.4			323.6	23,946	12,426	23,946	12,426			23,946	12,426
3	1.6			3	1.6	323.6	970.8	517.8			970.8	517.8	970.8	517.8
0.074	0.036					323.6	23.95	11.65					23.95	11.65
6.6	3	6.6	3			323.6	2,135.7	970.8	2,135.7	970.8			2,135.7	970.8
0.065	0.029	0.065	0.029			323.6	21.03	9.38	21.03	9.38			21.03	9.38
0.15	0.088					323.6	48.54	28.48					48.54	28.48
0.012	0.0056					323.6	3.88	1.81					3.88	1.81

*The BPT limits for these constituents are applicable only if they are more stringent than BAT limits (see STEP 5) below).

STEP 5: Calculate Amended BAT limits pursuant to 40 CFR § 419.43, for phenolic compounds (4AAP), total and hexavalent chromium. The effluent limit is equal to the sum of the products of each effluent limitation factor times the applicable process feedstock rate.

Pollutant	Process Category	BAT Effluent Limit Factors (lb/kbbl)		Feedstock (kbbl/d)	Effluent Limitation (lb/d)	
		Daily Max.	30-d Average		Daily Max.	30-d Average
Phenolic Compounds (4AAP)	Crude	0.013	0.003	382	4.97	1.15
	Cracking & Coking	0.147	0.036	323	47.48	11.63
	Reforming & Alkylation	0.132	0.032	85.86	11.33	2.75
				TOTAL	63.78	15.52
				(kg/d)	28.93	7.04
Total Chromium	Crude	0.011	0.004	336.18	4.20	1.53
	Cracking & Coking	0.119	0.041	253.37	38.44	13.24
	Reforming & Alkylation	0.107	0.037	67.46	9.19	3.18
				TOTAL	51.83	17.95
				(kg/d)	23.51	8.14
Hexavalent Chromium	Crude	0.0007	0.0003	336.18	0.27	0.11
	Cracking & Coking	0.0076	0.0034	253.37	2.45	1.10
	Reforming & Alkylation	0.0069	0.0031	67.46	0.59	0.27
				TOTAL	3.31	1.48
				(kg/d)	1.5	0.67

STEP 6: Compare Amended BAT limitations for phenolic compounds (4AAP), total chromium, and hexavalent chromium with BPT limitations.

Except for daily maximum limit for total chromium, and daily maximum and 30-day average limitations for phenolic compounds, the above BAT limits are more stringent than the BPT limits calculated in STEP 4. Therefore, for these constituents, the above BAT limits, the BPT limit for phenolic compounds (daily maximum of 23.95 lb/d, and 30-day average of 11.65 lb/d), and the daily maximum BPT limit and 30-day average BAT limit for total chromium (48.54 lb/d, and 30-day average of 17.95 lb/d) are considered for inclusion in the draft permit.

III. 3rd Set of Production-Based Effluent Limitations

These effluent limitation calculations include asphalt production rates from April 2001 through April 2002. This data set represents typical asphalt production rates for a 12-month period excluding turnaround time. Average asphalt production for this year equals 11.96 thousand barrels per day (kbbl/d).

STEP 1: Determine the size factor based on the refinery feedstock rate. Based on 40 CFR § 419 Subpart B, a total refinery throughput of 135 kbbl/d results in a

SIZE FACTOR = 1.35

STEP 2: Determine the process configuration based on the process rates:

Process	Process Feedstock Rate (kbbl/d)	Fraction of Total Throughput	Weight Factor	Process Configuration
Total Refinery Throughput = 135 kbbl/d				
CRUDE:				
Atmospheric Distillation	135	1		
Vacuum Crude Distillation	66.18	0.49		
Desalting	135	1		
TOTAL	336.18	2.49	1	2.49
CRACKING & COKING:				
Fluid Catalytic Cracking	66.73	0.49		
Fluid Coking	26.58	0.20		
Hydrocracking	30.46	0.23		
TOTAL	123.77	0.92	6	5.50
ASPHALT				
Asphalt Production	11.96	0.09		
TOTAL	11.96	0.09	12	1.06
TOTAL PROCESS CONFIGURATION =				9.05

(kbbl/d = Thousand Barrels per day)

STEP 3: Determine the process factor. Based on 40 CFR § 419 Subpart B, a total process configuration of 9.05 results in a

PROCESS FACTOR = 1.82

STEP 4: Based on 40 CFR § 419.22(a), 419.23(a), and 419.24(a), the BPT/BAT/BCT effluent limit is equal to

(THROUGHPUT) X (SIZE FACTOR) X (PROCESS FACTOR) X (EFFLUENT LIMIT FACTOR)

EFFLUENT LIMIT = (135)(1.35)(1.82)(Effluent Limit Factor)
= (331.7)(Effluent Limit Factor)

Effluent Limit in 40 CFR 419B						Multiplier	Final Limit Calculated						Final Limit	
BPT		BAT		BCT			BPT		BAT		BCT			
Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg		Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg
lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl		lb/d	lb/d	lb/d	lb/d	lb/d	lb/d	lb/d	lb/d
9.9	5.5			9.9	5.5	331.7	3284	1824			3284	1824	3284	1824
6.9	4.4			6.9	4.4	331.7	2289	1460			2289	1460	2289	1460
74	38.4	74	38.4			331.7	24,545	12,737	24,545	12,737			24,545	12,737
3	1.6			3	1.6	331.7	995	531			995	531	995	531
0.074	0.036					331.7	24.6	11.9					24.6	11.9

6.6	3	6.6	3			331.7	2189	995	2189	995			2189	995
0.065	0.029	0.065	0.029			331.7	21.6	9.6	21.6	9.6			21.6	9.6
0.15	0.088					331.7	50	29					50	29
0.012	0.0056					331.7	4	2					4	2

*The BPT limits for these constituents are applicable only if they are more stringent than BAT limits (see STEP 5) below).

STEP 5: Calculate Amended BAT limits pursuant to 40 CFR § 419.43, for phenolic compounds (4AAP), total and hexavalent chromium. The effluent limit is equal to the sum of the products of each effluent limitation factor times the applicable process feedstock rate.

Pollutant	Process Category	BAT Effluent Limit Factors (lb/kbbl)		Feedstock (kbbl/d)	Effluent Limitation (lb/d)	
		Daily Max.	30-d Average		Daily Max.	30-d Average
Phenolic Compounds (4AAP)	Crude	0.013	0.003	336.18	4.37	1.01
	Cracking & Coking	0.147	0.036	253.37	37.25	9.12
	Asphalt	0.079	0.019	11.96	0.94	0.23
	Reforming & Alkylation	0.132	0.032	67.46	8.90	2.16
				TOTAL	51.47	12.52
				(kg/d)	23.35	5.68
Total Chromium	Crude	0.011	0.004	336.18	3.70	1.34
	Cracking & Coking	0.119	0.041	253.37	30.15	10.39
	Asphalt	0.064	0.022	11.96	0.77	0.26
	Reforming & Alkylation	0.107	0.037	67.46	7.22	2.50
				TOTAL	41.83	14.49
				(kg/d)	18.97	6.57
Hexavalent Chromium	Crude	0.0007	0.0003	336.18	0.24	0.10
	Cracking & Coking	0.0076	0.0034	253.37	1.93	0.86
	Asphalt	0.0041	0.0019	11.96	0.05	0.02
	Reforming & Alkylation	0.0069	0.0031	67.46	0.47	0.21
				TOTAL	2.68	1.19
				(kg/d)	1.22	0.54

STEP 6: Compare Amended BAT limitations for phenolic compounds (4AAP), total chromium, and hexavalent chromium with BPT limitations.
Except for the daily maximum and 30-day average limitations for phenolic compounds (4AAP), the above BAT limits are more stringent than the BPT limits calculated in STEP 4. Therefore, for these constituents, the above BAT limits, and the BPT limits for phenolic compounds (4AAP) (daily maximum 24.55 lb/d and 30-day average 11.94 lb/d) are specified in the draft permit.

These alternate limitations shall apply after the Discharger certifies that asphalt plant process wastewater is routed through Outfall 001.

IV. 4th Set of Production-Based Effluent Limitations

The 4th set of effluent limitations shall apply after the Discharger certifies the increased crude throughput (to 150,000 barrels per day) and asphalt plant process wastewater has been routed to Outfall 001. Asphalt production rates from April 2001 through April 2002 were used in the calculations.

STEP 1: Determine the size factor based on the refinery feedstock rate. Based on 40 CFR § 419 Subpart B, a total refinery throughput of 150 kbbl/d results in a

SIZE FACTOR = 1.41

STEP 2: Determine the process configuration based on the process rates:

Process	Process Feedstock Rate (kbbl/d)	Fraction of Total Throughput	Weight Factor	Process Configuration
Total Refinery Throughput = 150 kbbl/d				
CRUDE:				
Atmospheric Distillation	150	1		
Vacuum Crude Distillation	82	0.55		
Desalting	150	1		
TOTAL	382	2.55	1	2.55
CRACKING & COKING:				
Fluid Catalytic Cracking	75	0.50		
Fluid Coking	32	0.21		
Hydrocracking	38	0.25		
TOTAL	145	0.97	6	5.80
ASPHALT				
Asphalt Production	11.96	0.09		
TOTAL	11.96	0.09	12	1.06
TOTAL PROCESS CONFIGURATION =				9.41

(kbbl/d = Thousand Barrels per day)

STEP 3: Determine the process factor. Based on 40 CFR § 419 Subpart B, a total process configuration of 9.41 results in a

PROCESS FACTOR = 1.82

STEP 4: Based on 40 CFR § 419.22(a), 419.23(a), and 419.24(a), the BPT/BAT/BCT effluent limit is equal to

(THROUGHPUT) X (SIZE FACTOR) X (PROCESS FACTOR) X (EFFLUENT LIMIT FACTOR)
EFFLUENT LIMIT = (150)(1.41)(1.82)(Effluent Limit Factor)
= (384.93)(Effluent Limit Factor)

Effluent Limit in 40 CFR 419B						Multiplier	Final Limit Calculated						Final Limit	
BPT		BAT		BCT			BPT		BAT		BCT			
Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg		Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg	Daily Max	30-d Avg
lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl	lb/kbbl		lb/d	lb/d	lb/d	lb/d	lb/d	lb/d	lb/d	lb/d
9.9	5.5			9.9	5.5	384.93	3,810.8	2,117.1			3,810.8	2,117.1	3,810.8	2,117.1
6.9	4.4			6.9	4.4	384.93	2,656	1,693.7			2,656	1,693.7	2,656	1,693.7
74	38.4	74	38.4			384.93	28,485	14,781	28,485	14,781			28,485	14,781
3	1.6			3	1.6	384.93	1,154.8	615.9			1,154.8	615.9	1,154.8	615.9
0.074	0.036					384.93	28.5	13.86					28.5	13.86
6.6	3	6.6	3			384.93	2,540.5	1,154.8	2,540.5	1,154.8			2,540.5	1,154.8
0.065	0.029	0.065	0.029			384.93	25	11.2	25	11.2			25	11.2
0.15	0.088					384.93	57.7	33.9					57.7	33.9
0.012	0.0056					384.93	4.6	2.2					4.6	2.2

*The BPT limits for these constituents are applicable only if they are more stringent than BAT limits (see STEP 5) below).

STEP 5: Calculate Amended BAT limits pursuant to 40 CFR § 419.43, for phenolic compounds (4AAP), total and hexavalent chromium. The effluent limit is equal to the sum of the products of each effluent limitation factor times the applicable process feedstock rate.

Pollutant	Process Category	BAT Effluent Limit Factors (lb/kbbl)		Feedstock (kbbl/d)	Effluent Limitation (lb/d)	
		Daily Max.	30-d Average		Daily Max.	30-d Average
Phenolic Compounds (4AAP)	Crude	0.013	0.003	382	4.97	1.15
	Cracking & Coking	0.147	0.036	323	47.48	11.63
	Asphalt	0.079	0.019	11.96	0.94	0.23
	Reforming & Alkylation	0.132	0.032	85.86	11.33	2.75

				TOTAL	64.73	15.75
				(kg/d)	29.36	7.14
Total Chromium	Crude	0.011	0.004	336.18	4.2	1.53
	Cracking & Coking	0.119	0.041	253.37	38.44	13.24
	Asphalt	0.064	0.022	11.96	0.77	0.26
	Reforming & Alkylation	0.107	0.037	67.46	9.19	3.18
				TOTAL	52.59	18.21
				(kg/d)	23.85	8.26
Hexavalent Chromium	Crude	0.0007	0.0003	336.18	0.27	0.11
	Cracking & Coking	0.0076	0.0034	253.37	2.45	1.10
	Asphalt	0.0041	0.0019	11.96	0.05	0.02
	Reforming & Alkylation	0.0069	0.0031	67.46	0.59	0.27
				TOTAL	3.36	1.50
				(kg/d)	1.52	0.68

STEP 6: Compare Amended BAT limitations for phenolic compounds (4AAP), total chromium, and hexavalent chromium with BPT limitations.

Except for the daily maximum and 30-day average limitations for phenolic compounds (4AAP), the above BAT limits are more stringent than the BPT limits calculated in STEP 4. Therefore, for these constituents, the above BAT limits, and the BPT limits for phenolic compounds (4AAP) (daily maximum 28.48 lb/d and 30-day average 13.86 lb/d) are specified in the draft permit.

Attachment 2
Valero Benicia Refinery
Reasonable Potential Analysis - Priority Pollutants
(1999-2001 data)
(July 2002)
(all values in micrograms per liter unless otherwise denoted)

											CTR Water Quality Criteria (ug/L)						Step 2		Step 3	
		From Table 4-3	Freshwater (from Table 3-4)				Saltwater (from Table 3-3)				Freshwater		Saltwater						MinDL (µg/L)	
# in CTR	PRIORITY POLLUTANTS	Deep Water (24-hr)	4-day	1-hr	24-hr	Max	4-day	1-hr	24-hr	Max	CMC (acute)	CCC (chronic)	CMC (acute)	CCC (chronic)	Organisms only	Lowest (most stringent) Criteria (1)	Number of data points	All non-Detected?	Minimum Detection Limit	If all data points are ND and MinDL>C, interim monitoring is required
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L				
1	Antimony														4,300	4300	1	Y	5	All ND, MinDL<C, MEC=MinDL
2	Arsenic	200	190	360			36	69			340	150	69	36		36	36	Y	2.5	All ND, MinDL<C, MEC=MinDL
3	Beryllium															No criteria	1	Y	4	No criteria
4	Cadmium	30.0	**0.62**	**1.6**			9.3	43			0.97	0.15	42.3	9.4		0.62	36	N		
5a	Chromium (III)										919.3	109.6				109.6				No data, to Step 5
5b	Chromium (VI) or total Cr	110	11	**16**			50	1,100			16	11	1,108	50		11	36	N		
6	**Copper**	200	6.09	8.53							6.7	4.8	**5.8**	**3.7**		3.7	36	N		
7	Lead	56	**1.18**	**30.4**			5.6	140			30.4	1.2	221	8.5		1.2	36	N		
8	**Mercury**	1	0.025	2.4			**0.025**	**2.1**							0.051	0.025	59	N		
9	**Nickel**	71	81.74	735.26	56	1,100			7.1	140	243.2	27.0	75	8.3	4,600	7.10	153	N		
10	**Selenium**										**20**	**5**	20	5		5	153	N		
11	Silver	23				1.07				2.3	1.1		2.2			1.07	36	Y	1	All ND, MinDL<C, MEC=MinDL
12	Thallium														6.3	6.30	1	Y	2	All ND, MinDL<C, MEC=MinDL
13	Zinc	580	**54.89**	**60.61**	58	170			58	170	62.1	62.1	95	86		54.89	153	N		
14	Cyanide	25	5.2	22				5			22	5	1	1	220,000	1	153	N		
15	Asbestos															No criteria				No criteria
16	**2,3,7,8-TCDD (Dioxin)**														0.000000014	0.000000014	NA	Y	0.00000384	All ND, MinDL>C, Go to Step 5, & IM
17	Acrolein														780	780	1	Y	20	All ND, MinDL<C, MEC=MinDL
18	Acrylonitrile														0.66	0.66	1	Y	20	All ND, MinDL>C, Go to Step 5, & IM
19	Benzene														71	71	3	Y	1	All ND, MinDL<C, MEC=MinDL
20	Bromoform														360	360	4	Y	1	All ND, MinDL<C, MEC=MinDL
21	Carbon Tetrachloride														4.4	4.4	4	Y	1	All ND, MinDL<C, MEC=MinDL
22	Chlorobenzene														21,000	21,000	4	Y	1	All ND, MinDL<C, MEC=MinDL
23	Chlordibromomethane														34	34	4	Y	1	All ND, MinDL<C, MEC=MinDL
24	Chloroethane															No criteria	4	Y	1	No criteria
25	2-Chloroethylvinyl Ether															No criteria	4	Y	1	No criteria
26	Chloroform															No criteria	4	Y	1	No criteria
27	Dichlorobromomethane														46	46	4	Y	1	All ND, MinDL<C, MEC=MinDL
28	1,1-Dichloroethane															No criteria	4	Y	1	No criteria
29	1,2-Dichloroethane														99	99	4	Y	1	All ND, MinDL<C, MEC=MinDL
30	1,1-Dichloroethylene														3.2	3.2	4	Y	1	All ND, MinDL<C, MEC=MinDL
31	1,2-Dichloropropane														39	39	4	Y	1	All ND, MinDL<C, MEC=MinDL
32	1,3-Dichloropropylene														1,700	1,700	4	Y	1	All ND, MinDL<C, MEC=MinDL
33	Ethylbenzene														29,000	29,000	4	Y	1	All ND, MinDL<C, MEC=MinDL
34	Methyl Bromide														4,000	4,000	4	Y	1	All ND, MinDL<C, MEC=MinDL
35	Methyl Chloride															No criteria	4	Y	1	No criteria
36	Methylene Chloride														1,600	1600	4	Y	1	All ND, MinDL<C, MEC=MinDL
37	1,1,2,2-Tetrachloroethane														11	11	4	Y	1	All ND, MinDL<C, MEC=MinDL
38	Tetrachloroethylene														8.85	8.85	4	Y	1	All ND, MinDL<C, MEC=MinDL
39	Toluene														200,000	200,000	3	Y	1	All ND, MinDL<C, MEC=MinDL
40	1,2-Trans-Dichloroethylene														140,000	140,000	4	Y	1	All ND, MinDL<C, MEC=MinDL
41	1,1,1-Trichloroethane															No criteria	4	Y	1	No criteria
42	1,1,2-Trichloroethane														42	42	4	Y	1	All ND, MinDL<C, MEC=MinDL
43	Trichloroethylene														81	81	4	Y	1	All ND, MinDL<C, MEC=MinDL
44	Vinyl Chloride														525	525	4	Y	1	All ND, MinDL<C, MEC=MinDL
45	Chlorophenol														400	400	4	Y	5	All ND, MinDL<C, MEC=MinDL
46	2,4-Dichlorophenol														790	790	4	Y	5	All ND, MinDL<C, MEC=MinDL
47	2,4-Dimethylphenol														2,300	2,300	4	Y	5	All ND, MinDL<C, MEC=MinDL
48	2-Methyl-4,6-Dinitrophenol														765	765	4	Y	24	All ND, MinDL<C, MEC=MinDL
49	2,4-Dinitrophenol														14,000	14,000	4	Y	42	All ND, MinDL<C, MEC=MinDL
50	2-Nitrophenol															No criteria	4	Y	5	No criteria
51	4-Nitrophenol															No criteria	4	Y	5	No criteria

Time/Date Printed: 11:50 AM 10/17/02
Filename: Valero Factsht Att 2-5.xls

Attachment 2
Valero Benicia Refinery
Reasonable Potential Analysis - Priority Pollutants
(1999-2001 data)
(July 2002)
(all values in micrograms per liter unless otherwise denoted)

			Step 4	Step 5	Step 6	Final Result [d]	
# in CTR	PRIORITY POLLUTANTS	MEC (µg/L) Maximum Pollutant Concentration from the effluent	MEC vs. C 1. If MEC> or =C, effluent limitation is required; 2. If MEC<C, go to Step 5	B (µg/L) Maximum Ambient Background Concentration	B vs. C If B>C, effluent limitation is required	Result	Reason
1	Antimony	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
2	Arsenic	2.5	MEC<C, go to Step 5	2.46	B<C, Step 7	No	MEC<C & B<C
3	Beryllium	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
4	Cadmium	0.56	MEC<C, go to Step 5	0.1268	B<C, Step 7	No	MEC<C & B<C
5a	Chromium (III)		No data, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	UD	no effluent data & no B
5b	Chromium (VI) or total Cr	18	**MEC>C, Effluent Limit requir**	4.4	B<C, Step 7	**Yes**	MEC>C
6	**Copper**	35.2	**MEC>C, Effluent Limit requir**	2.45	B<C, Step 7	**Yes**	MEC>C
7	Lead	8	**MEC>C, Effluent Limit requir**	0.8	B<C, Step 7	**Yes**	MEC>C
8	**Mercury**	0.053	**MEC>C, Effluent Limit requir**	0.0064	B<C, Step 7	**Yes**	MEC>C
9	**Nickel**	76.1	**MEC>C, Effluent Limit requir**	3.7	B<C, Step 7	**Yes**	MEC>C
10	**Selenium**	44	**MEC>C, Effluent Limit requir**	0.39	B<C, Step 7	**Yes**	MEC>C
11	Silver	1	MEC<C, go to Step 5	0.0683	B<C, Step 7	No	MEC<C & B<C
12	Thallium	2	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & B<C
13	Zinc	102	**MEC>C, Effluent Limit requir**	4.6	B<C, Step 7	**Yes**	MEC>C
14	Cyanide	50	**MEC>C, Effluent Limit requir**	No RMP data, Step 7	No ambient data, to Step 7	**Yes**	MEC>C
15	Asbestos	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
16	**2,3,7,8-TCDD (Dioxin)**	1		No RMP data, Step 7	No ambient data, to Step 7	Yes	Staff BPJ
17	Acrolein	20	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
18	Acrylonitrile	1		No RMP data, Step 7	No ambient data, to Step 7	No	MDL>C & no B
19	Benzene	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
20	Bromoform	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
21	Carbon Tetrachloride	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
22	Chlorobenzene	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
23	Chlordibromomethane	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
24	Chloroethane	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
25	2-Chloroethylvinyl Ether	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
26	Chloroform	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
27	Dichlorobromomethane	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
28	1,1-Dichloroethane	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
29	1,2-Dichloroethane	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
30	1,1-Dichloroethylene	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
31	1,2-Dichloropropane	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
32	1,3-Dichloropropylene	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
33	Ethylbenzene	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
34	Methyl Bromide	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
35	Methyl Chloride	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
36	Methylene Chloride	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
37	1,1,2,2-Tetrachloroethane	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
38	Tetrachloroethylene	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
39	Toluene	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
40	1,2-Trans-Dichloroethylene	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
41	1,1,1-Trichloroethane	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
42	1,1,2-Trichloroethane	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
43	Trichloroethylene	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
44	Vinyl Chloride	1	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
45	Chlorophenol	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
46	2,4-Dichlorophenol	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
47	2,4-Dimethylphenol	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
48	2-Methyl-4,6-Dinitrophenol	24	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
49	2,4-Dinitrophenol	42	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
50	2-Nitrophenol	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
51	4-Nitrophenol	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria

Attachment 2
Valero Benicia Refinery
Reasonable Potential Analysis - Priority Pollutants
(1999-2001 data)
(July 2002)
(all values in micrograms per liter unless otherwise denoted)

											CTR Water Quality Criteria (ug/L)						Step 2		Step 3	
		From Table 4-3	Freshwater (from Table 3-4)				Saltwater (from Table 3-3)				Freshwater		Saltwater						MinDL (µg/L)	
# in CTR	PRIORITY POLLUTANTS	Deep Water (24-hr)	4-day	1-hr	24-hr	Max	4-day	1-hr	24-hr	Max	CMC (acute)	CCC (chronic)	CMC (acute)	CCC (chronic)	Organisms only	Lowest (most stringent) Criteria (1)	Number of data points	All non-Detected?	Minimum Detection Limit	If all data points are ND and MinDL>C, interim monitoring is required
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L				
52	3-Methyl-4-Chlorophenol															No criteria	4	Y	5	No criteria
53	Pentachlorophenol										19	15	13	7.9	8.2	7.9	4	Y	5	All ND, MinDL<C, MEC=MinDL
54	Phenol														4,600,000	4600000	4	Y	5	All ND, MinDL<C, MEC=MinDL
55	2,4,6-Trichlorophenol														6.5	6.50	4	Y	5	All ND, MinDL<C, MEC=MinDL
56	Acenaphthene														2,700	2,700	4	Y	5	All ND, MinDL<C, MEC=MinDL
57	Acenephthylene															No criteria	4	Y	5	No criteria
58	Anthracene														110,000	110,000	4	Y	5	All ND, MinDL<C, MEC=MinDL
59	Benzidine														0.00054	0.00054	4	Y	44	All ND, MinDL>C, Go to Step 5, & IM
60	Benzo(a)Anthracene														0.049	0.049	12	Y	5	All ND, MinDL>C, Go to Step 5, & IM
61	Benzo(a)Pyrene														0.049	0.049	12	Y	5	All ND, MinDL>C, Go to Step 5, & IM
62	Benzo(b)Fluoranthene														0.049	0.049	12	Y	5	All ND, MinDL>C, Go to Step 5, & IM
63	Benzo(ghi)Perylene															No criteria	12	Y	5	No criteria
64	Benzo(k)Fluoranthene														0.049	0.049	12	Y	5	All ND, MinDL>C, Go to Step 5, & IM
65	Bis(2-Chloroethoxy)Methane															No criteria	4	Y	5	No criteria
66	Bis(2-Chloroethyl)Ether														1.4	1.4	4	Y	6	All ND, MinDL>C, Go to Step 5, & IM
67	Bis(2-Chloroisopropyl)Ether														170,000	170,000	4	Y	6	All ND, MinDL<C, MEC=MinDL
68	Bis(2-Ethylhexyl)Phthalate														5.9	5.9	4	Y	5	All ND, MinDL<C, MEC=MinDL
69	4-Bromophenyl Phenyl Ether															No criteria	4	Y	5	No criteria
70	Butylbenzyl Phthalate														5,200	5,200	4	Y	5	All ND, MinDL<C, MEC=MinDL
71	2-Chloronaphthalene														4,300	4,300	4	Y	5	All ND, MinDL<C, MEC=MinDL
72	4-Chlorophenyl Phenyl Ether															No criteria	4	Y	5	No criteria
73	Chrysene														0.049	0.049	40	Y	5	All ND, MinDL>C, Go to Step 5, & IM
74	Dibenzo(a,h)Anthracene														0.049	0.049	12	Y	5	All ND, MinDL>C, Go to Step 5, & IM
75	1,2-Dichlorobenzene														17,000	17,000	4	Y	5	All ND, MinDL<C, MEC=MinDL
76	1,3-Dichlorobenzene														2,600	2,600	4	Y	5	All ND, MinDL<C, MEC=MinDL
77	1,4-Dichlorobenzene														2,600	2,600	4	Y	5	All ND, MinDL<C, MEC=MinDL
78	3,3'-Dichlorobenzidine														0.077	0.077	4	Y	17	All ND, MinDL>C, Go to Step 5, & IM
79	Diethyl Phthalate														120,000	120,000	4	Y	5	All ND, MinDL<C, MEC=MinDL
80	Dimethyl Phthalate														2,900,000	2,900,000	4	Y	5	All ND, MinDL<C, MEC=MinDL
81	Di-n-Butyl Phthalate														12,000	12,000	4	Y	5	All ND, MinDL<C, MEC=MinDL
82	2,4-Dinitrotoluene														9.1	9.1	4	Y	6	All ND, MinDL<C, MEC=MinDL
83	2,6-Dinitrotoluene															No criteria	4	Y	5	No criteria
84	Di-n-Octyl Phthalate															No criteria	4	Y	5	No criteria
85	1,2-Diphenylhydrazine														0.54	0.54	1	Y	10	All ND, MinDL>C, Go to Step 5, & IM
86	Fluoranthene														370	370	17	Y	0.025	All ND, MinDL<C, MEC=MinDL
87	Fluorene														14,000	14,000	4	Y	5	All ND, MinDL<C, MEC=MinDL
88	Hexachlorobenzene														0.00077	0.00077	4	Y	5	All ND, MinDL>C, Go to Step 5, & IM
89	Hexachlorobutadiene														50	50	4	Y	5	All ND, MinDL<C, MEC=MinDL
90	Hexachlorocyclopentadiene														17,000	17,000	4	Y	5	All ND, MinDL<C, MEC=MinDL
91	Hexachloroethane														8.9	8.9	4	Y	5	All ND, MinDL<C, MEC=MinDL
92	Indeno(1,2,3-cd) Pyrene														0.049	0.049	40	Y	5	All ND, MinDL>C, Go to Step 5, & IM
93	Isophorone														600	600	4	Y	5	All ND, MinDL<C, MEC=MinDL
94	naphthalene															No criteria	4	Y	5	No criteria
95	Nitrobenzene														1,900	1,900	4	Y	5	All ND, MinDL<C, MEC=MinDL
96	N-Nitrosodimethylamine														8.1	8.1	4	Y	5	All ND, MinDL<C, MEC=MinDL
97	N-Nitrosodi-n-Propylamine														1.4	1.4	4	Y	5	All ND, MinDL>C, Go to Step 5, & IM
98	N-Nitrosodiphenylamine														16	16	4	Y	5	All ND, MinDL<C, MEC=MinDL
99	Phenanthrene															No criteria	4	Y	5	No criteria
100	Pyrene														11,000	11,000	4	Y	5	All ND, MinDL<C, MEC=MinDL
101	1,2,4-Trichlorobenzene															No criteria	4	Y	5	No criteria
102	Aldrin										3		1.3		0.00014	0.00014	1	Y	0.04	All ND, MinDL>C, Go to Step 5, & IM
103	alpha-BHC														0.013	0.013	1	Y	0.03	All ND, MinDL>C, Go to Step 5, & IM

Time/Date Printed: 11:50 AM 10/17/02
Filename: Valero Factsht Att 2-5.xls

Attachment 2
Valero Benicia Refinery
Reasonable Potential Analysis - Priority Pollutants
(1999-2001 data)
(July 2002)
(all values in micrograms per liter unless otherwise denoted)

			Step 4	Step 5	Step 6	Final Result [d]	
		MEC (µg/L)	MEC vs. C	B (µg/L)	B vs. C		
# in CTR	PRIORITY POLLUTANTS	Maximum Pollutant Concentration from the effluent	1. If MEC> or =C, effluent limitation is required; 2. If MEC<C, go to Step 5	Maximum Ambient Background Concentration	If B>C, effluent limitation is required	Result	Reason
52	3-Methyl-4-Chlorophenol	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
53	Pentachlorophenol	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
54	Phenol	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
55	2,4,6-Trichlorophenol	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
56	Acenaphthene	5	MEC<C, go to Step 5	0.0015	B<C, Step 7	No	MEC<C & B<C
57	Acenephthylene	No criteria	No criteria	0.00053	No criteria	Uo	No criteria
58	Anthracene	5	MEC<C, go to Step 5	0.0005	B<C, Step 7	No	MEC<C & B<C
59	Benzidine	1		No RMP data, Step 7	No ambient data, to Step 7	No	MDL>C & no B
60	Benzo(a)Anthracene	1		0.0053	B<C, Step 7	Yes	Staff BPJ
61	Benzo(a)Pyrene	1		0.00029	B<C, Step 7	Yes	Staff BPJ
62	Benzo(b)Fluoranthene	1		0.0046	B<C, Step 7	Yes	Staff BPJ
63	Benzo(ghi)Perylene	No criteria	No criteria	0.0027	No criteria	Uo	No criteria
64	Benzo(k)Fluoranthene	1		0.0015	B<C, Step 7	Yes	Staff BPJ
65	Bis(2-Chloroethoxy)Methane	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
66	Bis(2-Chloroethyl)Ether	1		No RMP data, Step 7	No ambient data, to Step 7	No	MDL>C & B<C
67	Bis(2-Chloroisopropyl)Ether	6	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
68	Bis(2-Ethylhexyl)Phthalate	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
69	4-Bromophenyl Phenyl Ether	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
70	Butylbenzyl Phthalate	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
71	2-Chloronaphthalene	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
72	4-Chlorophenyl Phenyl Ether	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
73	Chrysene	1		0.0024	B<C, Step 7	Yes	Staff BPJ
74	Dibenzo(a,h)Anthracene	1		0.00064	B<C, Step 7	Yes	Staff BPJ
75	1,2-Dichlorobenzene	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
76	1,3-Dichlorobenzene	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
77	1,4-Dichlorobenzene	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
78	3,3'-Dichlorobenzidine	1		No RMP data, Step 7	No ambient data, to Step 7	No	MDL>C & no B
79	Diethyl Phthalate	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
80	Dimethyl Phthalate	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
81	Di-n-Butyl Phthalate	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
82	2,4-Dinitrotoluene	6	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
83	2,6-Dinitrotoluene	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
84	Di-n-Octyl Phthalate	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
85	1,2-Diphenylhydrazine	1		No RMP data, Step 7	No ambient data, to Step 7	No	MDL>C & no B
86	Fluoranthene	0.025	MEC<C, go to Step 5	0.011	B<C, Step 7	Yes	Staff BPJ
87	Fluorene	5	MEC<C, go to Step 5	0.00208	B<C, Step 7	No	MEC<C & B<C
88	Hexachlorobenzene	1		0.0000202	B<C, Step 7	No	MDL>C & B<C
89	Hexachlorobutadiene	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
90	Hexachlorocyclopentadiene	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
91	Hexachloroethane	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
92	Indeno(1,2,3-cd) Pyrene	1		0.004	B<C, Step 7	Yes	Staff BPJ
93	Isophorone	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
94	naphthalene	No criteria	No criteria	0.0023	No criteria	Uo	No criteria
95	Nitrobenzene	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
96	N-Nitrosodimethylamine	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
97	N-Nitrosodi-n-Propylamine	1		No RMP data, Step 7	No ambient data, to Step 7	No	MDL>C & no B
98	N-Nitrosodiphenylamine	5	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
99	Phenanthrene	No criteria	No criteria	0.0061	No criteria	Uo	No criteria
100	Pyrene	5	MEC<C, go to Step 5	0.0051	B<C, Step 7	No	MEC<C & B<C
101	1,2,4-Trichlorobenzene	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
102	Aldrin	1		No RMP data, Step 7	No ambient data, to Step 7	No	MDL>C & no B
103	alpha-BHC	1		No RMP data, Step 7	No ambient data, to Step 7	No	MDL>C & no B

Time/Date Printed: 11:50 AM 10/17/02
Filename: Valero Factsht Att 2-5.xls

Attachment 2
Valero Benicia Refinery
Reasonable Potential Analysis - Priority Pollutants
(1999-2001 data)
(July 2002)
(all values in micrograms per liter unless otherwise denoted)

# in CTR	PRIORITY POLLUTANTS	From Table 4-3	Freshwater (from Table 3-4)				Saltwater (from Table 3-3)				CTR Water Quality Criteria (ug/L)					Lowest (most stringent) Criteria (1)	Step 2		Step 3	
											Freshwater		Saltwater						MinDL (µg/L)	
		Deep Water (24-hr)	4-day	1-hr	24-hr	Max	4-day	1-hr	24-hr	Max	CMC (acute)	CCC (chronic)	CMC (acute)	CCC (chronic)	Organisms only		Number of data points	All non-Detected?	Minimum Detection Limit	If all data points are ND and MinDL>C, interim monitoring is required
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L				
104	beta-BHC														0.046	0.046	1	Y	0.06	All ND, MinDL>C, Go to Step 5, & IM
105	gamma-BHC										0.95		0.16		0.063	0.063	1	Y	0.09	All ND, MinDL>C, Go to Step 5, & IM
106	delta-BHC															No criteria	1	Y	0.04	No criteria
107	**Chlordane**										2.4	0.0043	0.09	0.004	0.00059	0.00059	1	Y	1	All ND, MinDL>C, Go to Step 5, & IM
108	**4,4-DDT**										1.1	0.001	0.13	0.001	0.00059	0.00059	1	Y	0.11	All ND, MinDL>C, Go to Step 5, & IM
109	4,4-DDE														0.00059	0.00059	1	Y	0.04	All ND, MinDL>C, Go to Step 5, & IM
110	4,4-DDD														0.00084	0.00084	1	Y	0.12	All ND, MinDL>C, Go to Step 5, & IM
111	**Dieldrin**										0.24	0.056	0.71	0.0019	0.00014	0.00014	1	Y	0.02	All ND, MinDL>C, Go to Step 5, & IM
112	alpha-Endosulfan										0.22	0.056	0.034	0.0087	240	0.0087	1	Y	0.14	All ND, MinDL>C, Go to Step 5, & IM
113	beta-Endosulfan										0.22	0.056	0.034	0.0087	240	0.0087	1	Y	0.04	All ND, MinDL>C, Go to Step 5, & IM
114	Endosulfan Sulfate														240	240	1	Y	0.66	All ND, MinDL<C, MEC=MinDL
115	Endrin										0.086	0.036	0.037	0.0023	0.81	0.0023	1	Y	0.06	All ND, MinDL>C, Go to Step 5, & IM
116	Endrin Aldehyde														0.81	0.81	1	Y	0.23	All ND, MinDL<C, MEC=MinDL
117	Heptachlor										0.52	0.0038	0.053	0.0036	0.00021	0.00021	1	Y	0.03	All ND, MinDL>C, Go to Step 5, & IM
118	Heptachlor Epoxide										0.52	0.0038	0.053	0.0036	0.00011	0.00011	1	Y	0.83	All ND, MinDL>C, Go to Step 5, & IM
119-125	**PCBs sum (2)**											0.014		0.03	0.00017	0.00017	3 for each	Y	1	All ND, MinDL>C, Go to Step 5, & IM
126	Toxaphene										0.73	0.0002	0.21	0.0002	0.00075	0.0002	1	Y	1	All ND, MinDL>C, Go to Step 5, & IM
	Tributyltin		0.02		0.04	0.06	0.005									0.005				No data, to Step 5

Notes:

(1) Reasonable Potential Analysis based on the lowest CTR criteria except for arsenic, cadmium, chromium, lead, mercury, nickel, silver and zinc (where the Basin Plan water quality objectives apply).

(2) PCBs sum refers to sum of PCB 1016, 1221, 1232, 1242, 1248, 1254, and 1260

(3) Receiving body: minimum hardness from Pacheco Creek RMP Station = 46 mg/L as CaCO3; default pH = 7.8

Bold are 303(d) listed pollutants

Attachment 2
Valero Benicia Refinery
Reasonable Potential Analysis - Priority Pollutants
(1999-2001 data)
(July 2002)
(all values in micrograms per liter unless otherwise denoted)

			Step 4	Step 5	Step 6	Final Result [d]	
		MEC (µg/L)	MEC vs. C	B (µg/L)	B vs. C		
# in CTR	PRIORITY POLLUTANTS	Maximum Pollutant Concentration from the effluent	1. If MEC> or =C, effluent limitation is required; 2. If MEC<C, go to Step 5	Maximum Ambient Background Concentration	If B>C, effluent limitation is required	Result	Reason
104	beta-BHC	[1]		No RMP data, Step 7	No ambient data, to Step 7	No	MDL>C & no B
105	gamma-BHC	[1]		No RMP data, Step 7	No ambient data, to Step 7	No	MDL>C & no B
106	delta-BHC	No criteria	No criteria	No RMP data, Step 7	No criteria	Uo	No criteria
107	**Chlordane**	[1]		0.00018	B<C, Step 7	No	MDL>C & B<C
108	**4,4-DDT**	[1]		0.000066	B<C, Step 7	No	MDL>C & B<C
109	4,4-DDE	[1]		0.00069	**B>C, Effluent Limit require**	**Yes**	B>C
110	4,4-DDD	[1]		0.000313	B<C, Step 7	No	MDL>C & B<C
111	**Dieldrin**	[1]		0.000264	**B>C, Effluent Limit require**	**Yes**	B>C
112	alpha-Endosulfan	[1]		0.000031	B<C, Step 7	No	MDL>C & B<C
113	beta-Endosulfan	[1]		0.000069	B<C, Step 7	No	MDL>C & B<C
114	Endosulfan Sulfate	0.66	MEC<C, go to Step 5	0.0000819	B<C, Step 7	No	MEC<C & B<C
115	Endrin	[1]		0.000036	B<C, Step 7	No	MDL>C & B<C
116	Endrin Aldehyde	0.23	MEC<C, go to Step 5	No RMP data, Step 7	No ambient data, to Step 7	No	MEC<C & no B
117	Heptachlor	[1]		0.000019	B<C, Step 7	No	MDL>C & B<C
118	Heptachlor Epoxide	[1]		0.000094	B<C, Step 7	No	MDL>C & B<C
119-125	**PCBs sum (2)**	[1]		No RMP data, Step 7	No ambient data, to Step 7	Yes	Staff BPJ
126	Toxaphene	[1]		No RMP data, Step 7	No ambient data, to Step 7	No	MDL>C & no B
	Tributyltin			No RMP data, Step 7	No ambient data, to Step 7	UD	No effluent data & no B

Notes:

(1) Reasonable Potential Analysis based and zinc (where the Basin Plan wate

(2) PCBs sum refers to sum of PCB 101

(3) Receiving body: minimum hardness

Bold are 303(d) listed pollutants

Time/Date Printed: 11:50 AM 10/17/02
Filename: Valero Factsht Att 2-5.xls

PRIORITY POLLUTANTS	Chromium VI	Copper	Lead	Mercury	Nickel	Selenium	Zinc	4,4'-DDE	Dieldrin	Other PAHs	PCBs
Basis and Criteria type	BP FW (4-d, 1-hr avg)	CTR - SW	BP FW (4-d, 1-hr avg)	BP SW (4-d, 1-hr avg)	BP SW (24-hr, inst. Max)	NTR-FW	BP FW (4-d, 1-hr avg)	HH	HH	HH	HH
Lowest WQO	11.0	3.7	1.2	0.025	7.1	5.0	54.89	0.00059	0.00014	0.04900	0.00017
Translators		0.83									
Dilution Factor (D) (if applicable)	9	9	9		9		9			9	9
no. of samples per month	4	4	4	4	4	4	4	4	4	4	4
Aquatic life criteria required? (Y/N)	Y	Y	Y	Y	Y	Y	Y	N	N	N	N
HH criteria analysis required? (Y/N)	N	N	N	Y	Y	N	N	Y	Y	Y	Y
Applicable Acute WQO	16	5.8	30.4	2.1	140	20	60.61				
Applicable Chronic WQO	11	3.7	1.2	0.025	7.1	5	54.89				
HH criteria				0.051	4600			0.00059	0.00014	0.04900	0.00017
Background (max conc)	4.4	2.45	0.8	0.0064	3.7	0.39	4.6	0.00069	0.000264	0	0
Background (avg conc for HH calc)				0.00334	2.10			0.00012	0.00008		
Is the pollutant Bioaccumulative(Y/N)? (e.g., Hg)	N	N	N	Y	N	Y	N	Y	Y	Y	Y
ECA acute	120.4	35.95	296.8	2.1	1366.7	20	564.7				
ECA chronic	70.4	14.95	4.8	0.025	37.7	5	507.5				
ECA HH				0.051	45981.1			0.00059	0.00014	0.049	0.00017
No. of data points <10 or at least 80% of data reported non detect? (Y/N)	Y	N	Y	N	N	N	N	Y	Y	Y	Y
avg of data points		8.13		0.0211	16.19	23.42	26.76				
SD		6.66		0.0097	10.06	6.81	21.61				
CV calculated	N/A	0.82	N/A	0.46	0.62	0.29	0.81	N/A	N/A	N/A	N/A
CV (Selected) - Final	0.60	0.82	0.60	0.46	0.62	0.29	0.81	0.60	0.60	0.60	0.60
ECA acute mult99	0.32	0.24	0.32	0.40	0.31	0.54	0.25				
ECA chronic mult99	0.53	0.43	0.53	0.61	0.52	0.72	0.44				
LTA acute	38.66	8.78	95.30	0.84	426.07	10.74	139.68				
LTA chronic	37.13	6.46	2.53	0.02	19.49	3.61	221.66				
minimum of LTAs	37.13	6.46	2.53	0.02	19.49	3.61	139.68				
AMEL mult95	1.55	1.77	1.55	1.41	1.57	1.26	1.76	1.55	1.55	1.55	1.55
MDEL mult99	3.11	4.10	3.11	2.51	3.21	1.86	4.04	3.11	3.11	3.11	3.11
AMEL (aq life)	57.64	11.43	3.93	0.02	30.66	4.53	245.44				
MDEL(aq life)	115.64	26.48	7.88	0.04	62.51	6.72	564.70				
MDEL/AMEL Multiplier	2.01	2.32	2.01	1.77	2.04	1.48	2.30	2.01	2.01	2.01	2.01
AMEL (human hlth)				0.051	45,981			0.00059	0.00014	0.049	0.00017
MDEL (human hlth)				0.09	93,749			0.00118	0.00028	0.09830	0.00034
minimum of AMEL for Aq. life vs HH	57.64357	11.43319	3.93024	0.02143	30.66136	4.53126	245.43673	0.00059	0.00014	0	0
minimum of MDEL for Aq. Life vs HH	115.64390	26.47577	7.88481	0.03803	62.51434	6.72234	564.70000	0.00118	0.00028	0	0
Current limit in permit (30-d avg)	N/A	N/A	N/A	0.21	N/A	N/A	N/A	N/A	N/A	N/A	0.0007
Current limits in permit (daily)	N/A	36	N/A	1	65	50	580	N/A	N/A	N/A	0.3
Final limit - AMEL	57.64	11.43	3.93	0.02	30.66	4.53	245.44	0.000590	0.000140	0.04900	0.00017
Final limit - MDEL	115.64	26.48	7.88	0.04	62.51	6.72	564.70	0.001184	0.000281	0.09830	0.00034
Max Effl Conc (MEC), 1999-2001	18	35.2	8.00	0.053	76.1	44	102	<0.04	<0.02	<5	<1
Interim Limits		36	insufficient data	0.075	65	50					

1. As per Step 3 of Section 1.4 of the SIP, the CV is calculated using one-half the value of the detection limit for all values in the data set which are non-detect.
2. For data sets less than 10 points, CV is set at a default of 0.6 as per SIP.

Attachment 4
Mercury Mass Emission Limitation
(1999-2001 data)

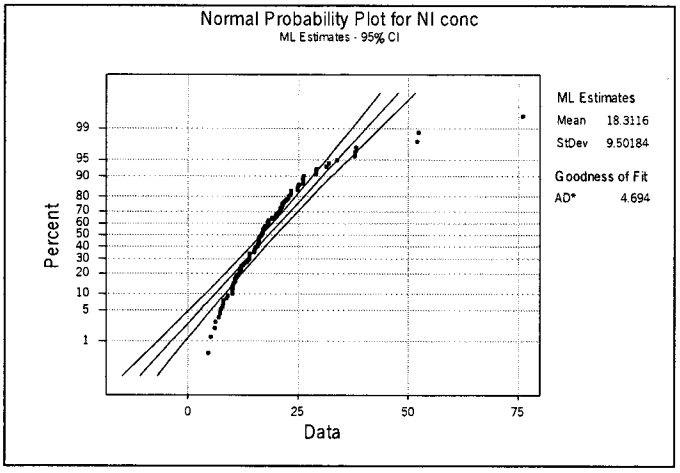
Date	Monthly average flow rate (MGD)	Monthly average mercury (ug/L)	1/00-12/01 Mass (g/day)	Mass Load (g/day)
Jan-99	2.449355	0.05	0.463591	
Feb-99	1.525357	0.05	0.288705	
Mar-99	1.979677	0.05	0.374695	
Apr-99	1.954333	0.05	0.369898	
May-99	2.009355	0.05075	0.386016	
Jun-99	2.003	0.05	0.379109	
Jul-99	1.912258	0.05	0.361934	
Aug-99	1.941935	0.05	0.367551	
Sep-99	1.867	0.05	0.353368	
Oct-99	1.790968	0.05	0.338978	
Nov-99	1.629	0.05	0.308322	
Dec-99	1.66	0.05	0.314189	0.35886302
Jan-00	1.746452	0.0428	0.282952	0.34380982
Feb-00	2.204828	0.0189	0.157743	0.33289629
Mar-00	2.321935	0.0148	0.130084	0.31251209
Apr-00	2.187		0	0.28168727
May-00	2.095161	0.01	0.07931	0.25612844
Jun-00	1.888	0.0092	0.065751	0.23001528
Jul-00	1.891613	0.007	0.050124	0.20403107
Aug-00	1.843871	0.008	0.055838	0.17805501
Sep-00	2.095333	0.0067	0.053142	0.15303619
Oct-00	1.95871	0.0052	0.038556	0.12800102
Nov-00	1.879667	0.0088	0.062615	0.10752544
Dec-00	1.309355	0.00901	0.044658	0.08506447
Jan-01	2.132581	0.0054	0.043593	0.06511781
Feb-01	1.770357	0.0062	0.041549	0.05543504
Mar-01	2.182581	0.0184	0.15202	0.05726302
Apr-01	1.99	0.0243	0.183051	0.07251729
May-01	2.075806	0.0161	0.12651	0.0764506
Jun-01	2.006333	0.0173	0.13139	0.08192051
Jul-01	1.751935	0.017375	0.115227	0.08734583
Aug-01	1.61	0.0113	0.068868	0.08843162
Sep-01	1.829667	0.014	0.096965	0.09208347
Oct-01	1.540645	0.0098	0.057153	0.09363329
Nov-01	2.084667	0.0093	0.073389	0.09453117
Dec-01	2.62	0.009	0.08926	0.09824804
Count, n				25
Maximum MA value, g/d				0.35886302
Maximum mass, kg/mo				0.01091661
Average Moving Average Load				0.15738412
Standard Deviation MA Load				0.1011826
99.7 %tile				0.35777919
Ave + 3SD, g/d				0.46093191
Ave + 3SD, kg/mo				0.01402155
Mercury Mass Emission Limit =				**0.01402155** **kg/month**

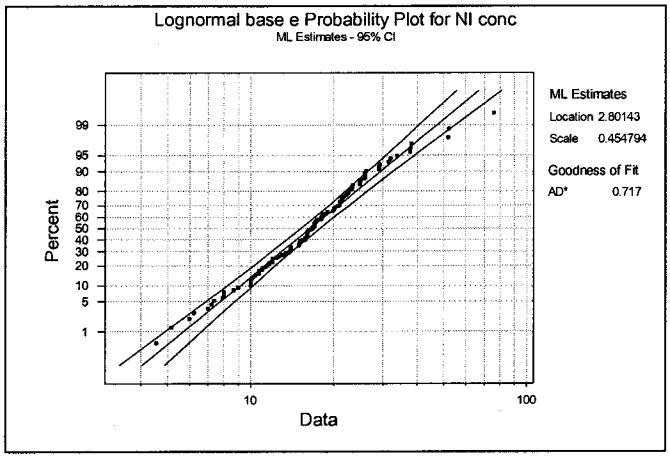
Rank	Concentration (Ni detected)	ln (Ni)
1	17.00	2.833213344
2	4.56	1.517322611
3	5.16	1.64093655
4	6	1.791759469
5	6.25	1.832581464
6	7	1.945910149
7	7.23	1.978239039
8	7.38	1.998773654
9	7.90	2.066862772
10	8	2.079441542
11	8	2.079441542
12	8.70	2.163323004
13	9	2.197224577
14	10	2.302585093
15	10	2.302585093
16	10	2.302585093
17	10	2.302585093
18	10.1	2.312535462
19	10.2	2.322387702
20	10.4	2.341805769
21	10.7	2.370243724
22	10.7	2.370243724
23	10.70	2.370243724
24	11	2.397895273
25	11	2.397895273
26	11.3	2.424802743
27	11.5	2.442347035
28	11.7	2.459588826
29	11.7	2.459588826
30	12	2.48490665
31	12	2.48490665
32	12	2.48490665
33	12	2.48490665
34	12.4	2.517696442
35	12.6	2.533696844
36	13	2.564949357
37	13.3	2.58776405
38	13.5	2.602689685
39	13.8	2.624668606
40	13.9	2.631888813

Nickel, Continued		
41	14	2.6390573
42	14	2.6390573
43	14	2.6390573
44	14	2.6390573
45	14.0	2.6390573
46	15	2.7080502
47	15	2.7080502
48	15	2.7080502
49	15.10	2.7146948
50	15.2	2.7212954
51	15.2	2.7212954
52	15.40	2.7343675
53	15.80	2.76001
54	15.8	2.76001
55	15.9	2.7663191
56	16	2.7725887
57	16	2.7725887
58	16	2.7725887
59	16	2.7725887
60	16	2.7725887
61	16	2.7725887
62	16.1	2.7788193
63	16.2	2.7850113
64	16.5	2.8033604
65	16.7	2.8154088
66	16.7	2.8154088
67	16.9	2.8273136
68	17	2.8332133
69	17	2.8332133
70	17	2.8332133
71	17.2	2.8449094
72	17.2	2.8449094
73	17.4	2.8564702
74	17.5	2.8622009
75	18	2.8903718
76	18	2.8903718
77	18	2.8903718
78	18.1	2.895912
79	18.1	2.895912
80	18.3	2.906901

Nickel, Continued		
81	18.299999	2.906901
82	19	2.944439
83	19	2.944439
84	19.799999	2.9856819
85	20	2.9957323
86	20	2.9957323
87	20.1	3.0007198
88	20.200001	3.0056826
89	20.700001	3.0301337
90	21	3.0445224
91	21	3.0445224
92	21	3.0445224
93	21	3.0445224
94	21.299999	3.058707
95	21.4	3.0633909
96	21.4	3.0633909
97	21.5	3.0680529
98	21.700001	3.0773123
99	22	3.0910425
100	22.299999	3.1045866
101	22.5	3.1135153
102	22.700001	3.122365
103	22.700001	3.122365
104	23.200001	3.1441523
105	23.299999	3.1484533
106	23.4	3.152736
107	23.4	3.152736
108	24.9	3.2148678
109	24.9	3.2148678
110	25	3.2188758
111	25.1	3.2228679
112	26	3.2580965
113	26	3.2580965
114	26	3.2580965
115	26	3.2580965
116	26.200001	3.2657594
117	29	3.3672958
118	29	3.3672958
119	29.200001	3.3741687
120	31.5	3.4499875

Nickel, Continued		
121	32	3.4657359
122	33.9000015	3.5234151
123	37.7999992	3.6323091
124	38	3.6375862
125	38.0999985	3.6402142
126	52	3.9512437
127	52.2999992	3.9569964
128	76.0999985	4.3320482
129	< 5	1.6094379
130	< 5	1.6094379
131	< 5	1.6094379
132	< 10	2.3025851
133	< 10	2.3025851
134	< 10	2.3025851
135	< 10	2.3025851
136	< 10	2.3025851
137	< 10	2.3025851
138	< 10	2.3025851
139	< 10	2.3025851
140	< 10	2.3025851
141	< 10	2.3025851
142	< 10	2.3025851
143	< 10	2.3025851
144	< 10	2.3025851
145	< 10	2.3025851
146	< 10	2.3025851
147	< 10	2.3025851
148	< 10	2.3025851
149	< 10	2.3025851
150	<12	2.4849066
151	< 20	2.9957323
152	<30	3.4011974
153	<30	3.4011974
count	153	153
average		2.67
st. deviation		0.529
avg +3*SD	ln	4.257
avg +3*SD		70.6





Attachment 6
Valero Benicia Refinery
General Basis for Final Compliance Dates
Revised May 1, 2001

Constituent	Reference for applicable standard	Maximum compliance schedule allowed	Compliance date and Basis
Cyanide (CCC of 1 ppb)	NTR	5 years	**May 18, 2003** because background date not adequate. Time needed to collect more background and possibly for SSO (**plus 5-yr** in finding not to go beyond May 18, 2010). Basis is SIP 2.2.2.
Copper (salt), Chromium (III), Selenium	CTR (NTR for Se)	5 years	**5-yr from effective date of permit** (but not to go beyond May 18, 2010). Basis are CTR and SIP.
Copper (fresh), mercury, nickel, zinc, arsenic, cadmium, lead, chromium (VI), silver (CMC)	Numeric Basin Plan using SIP methodology	10 years	**March 31, 2010,** which is 10 years (using full months) from effective date of SIP (April 28, 2000). Basis is the Basin Plan, see note [1].
Dioxins/Furans, Tributyltin, other toxic pollutants not in CTR	Narrative Basin Plan using SIP methodology	10 years	**10-yr from effective date of permit** (which is when new standard is adopted; no sunset date). Basis is the Basin Plan, see note [1].
Other priority pollutants on CTR/NTR and not listed above	CTR/NTR	5 years	**5-yr from effective date of permit** (but not to go beyond May 18, 2010). Basis is the CTR and SIP.

[1] The Basin Plan provides for a 10-year compliance schedule for implementation of measures to comply with new standards as of the effective date of those standards. This provision has been construed to authorize compliance schedules for new interpretations of existing standards, such as the numeric and narrative water quality objectives specified in the Basin Plan, if the new interpretations result in more stringent limits than in the previous permit.

a. For numeric objectives, due to the adoption of the SIP, the Regional Board has newly interpreted these objectives. The effective date of this new interpretation is the effective date of the SIP (April 28, 2000) for implementation of these numeric Basin Plan objectives.

b. For narrative objectives, the Board must newly interpreted these objectives using best professional judgment for each permit. Therefore, the effective date of this new interpretation will be the effective date of the permit.